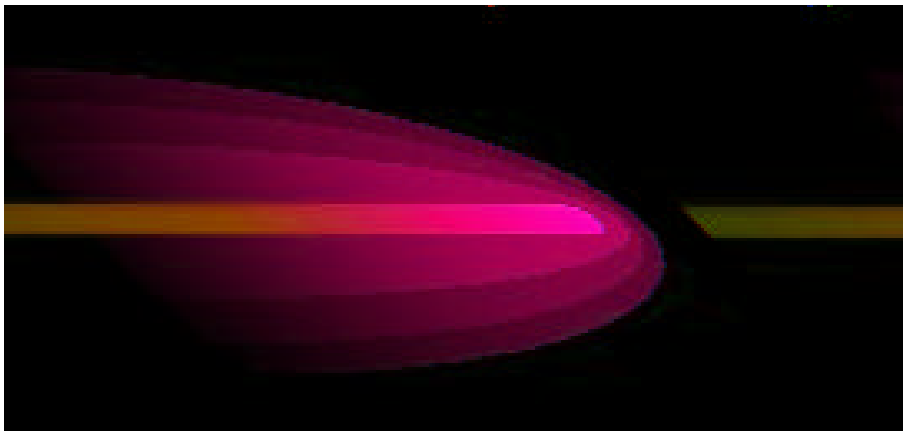
MULTIMEDIA DEVELOPMENT GUIDE



NOVEMBER 2000

Developed by the Multimedia Development Branch
Department of Distance Learning

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

Chapter 1 INTERACTIVE MULTIMEDIA INSTRUCTION (IMI) DEVELOPMENT OVERVIEW

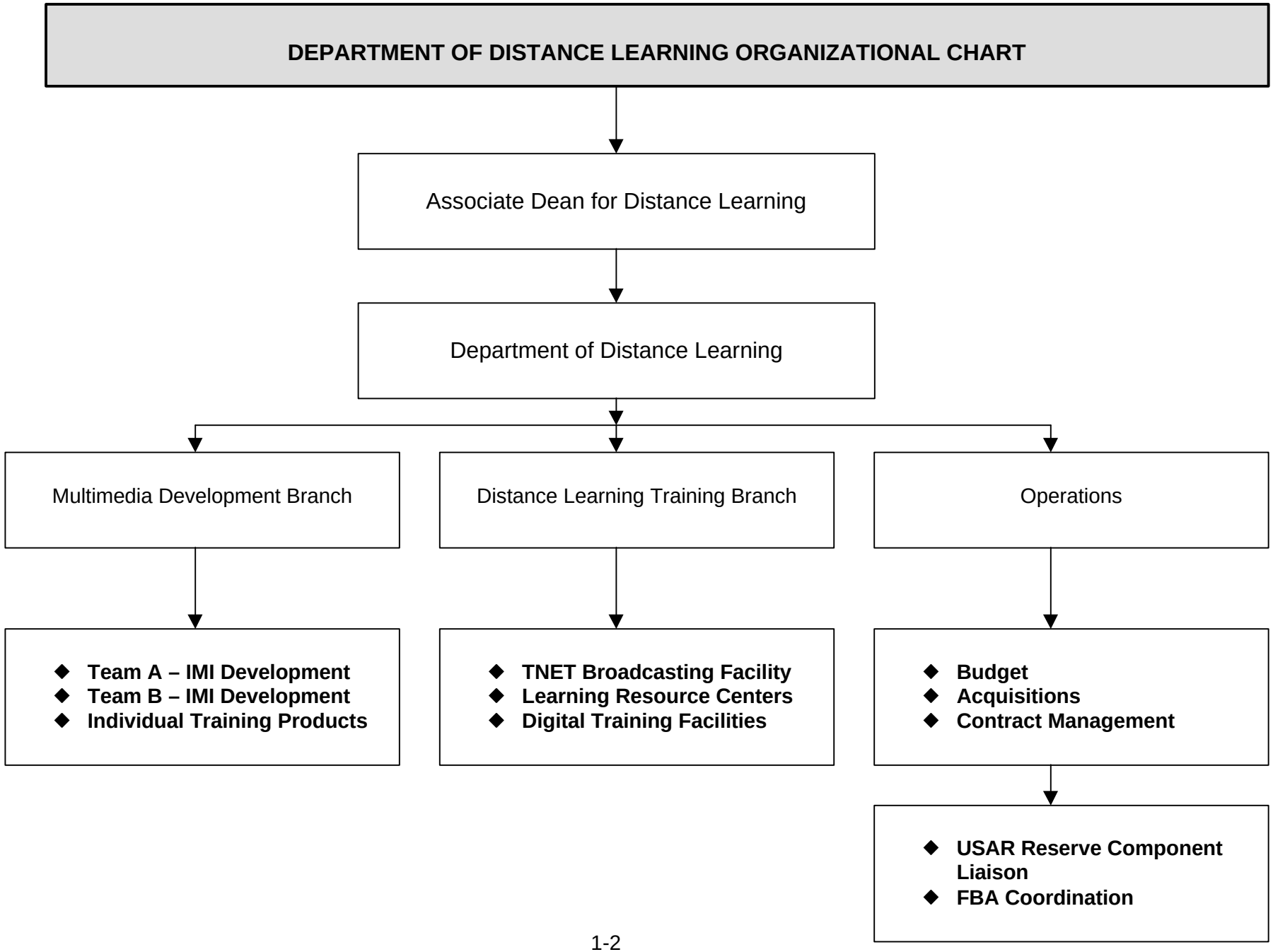
PURPOSE OF THIS DOCUMENT

This document outlines a process for developing interactive multimedia instruction for use either via CD-ROM or the Internet. The process for development remains the same regardless of the delivery platform (operating system and browser, if applicable), level of sophistication (amount and types of audio, video, animations, etc.) or interactivity level.

Computerized training may be variously termed: computer-based training (CBT), technology based training (TBT), or if intended for the Internet, web-based training (WBT).

Interactive Multimedia Instruction (IMI) is a more descriptive term, as it includes reference to the two concepts that are central to training delivered in this medium: *interactivity and multimedia.* What distinguishes IMI from other forms of training is the interactivity that it seeks to achieve. The learner is involved, engaged, and participating actively in the learning.

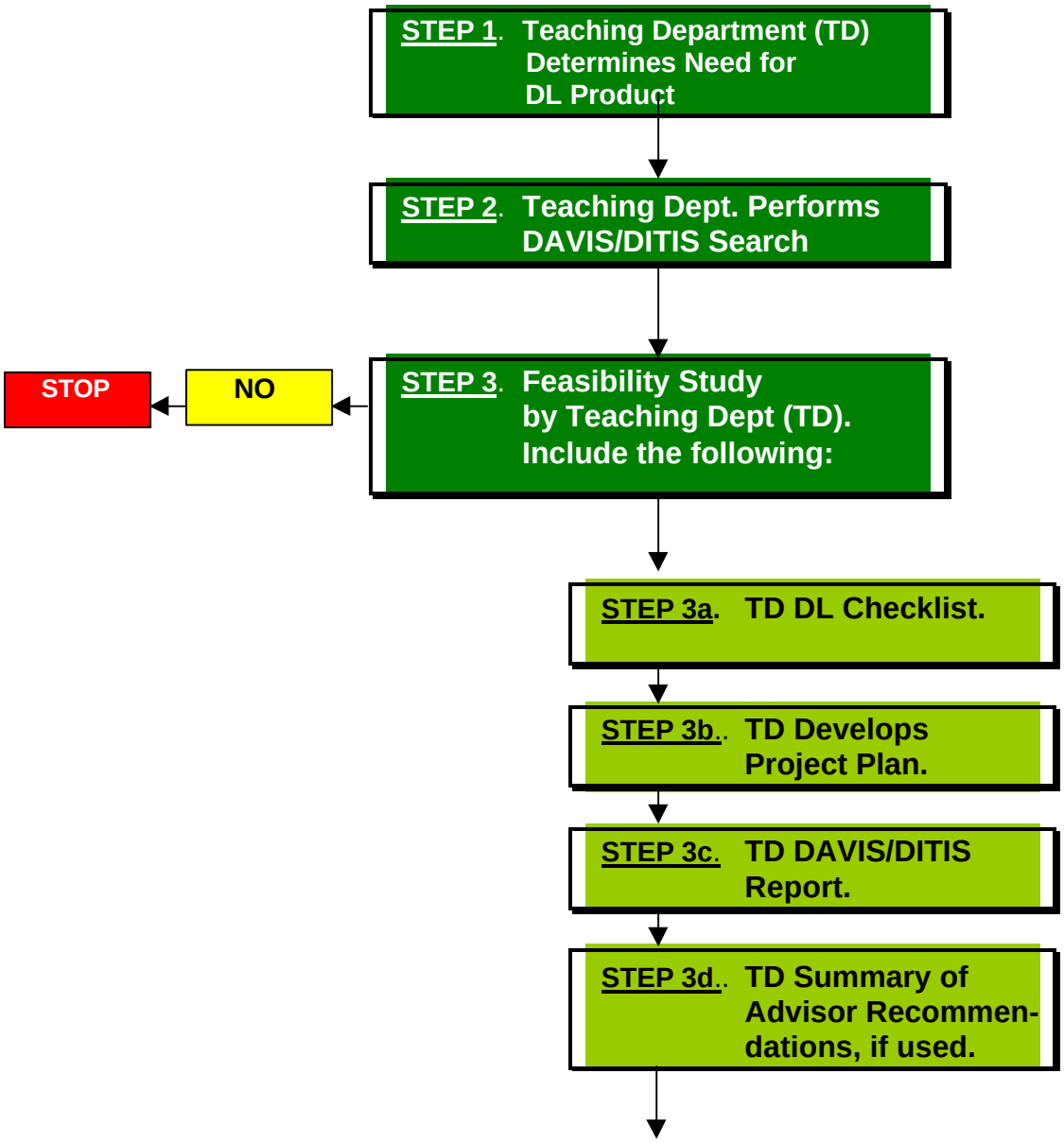
The training is presented through the use of a variety of media: text on the screen, line drawings, photographs, short video clips, audio narration clips, ambient sound clips (to create a mood e.g., the sound of a hospital loudspeaker calling Dr. Blair, the sound of crickets), and music. The artful combining of these diverse elements is what makes for good IMI. It requires training developers to think somewhat like a film director to successfully combine these disparate elements into a given frame.

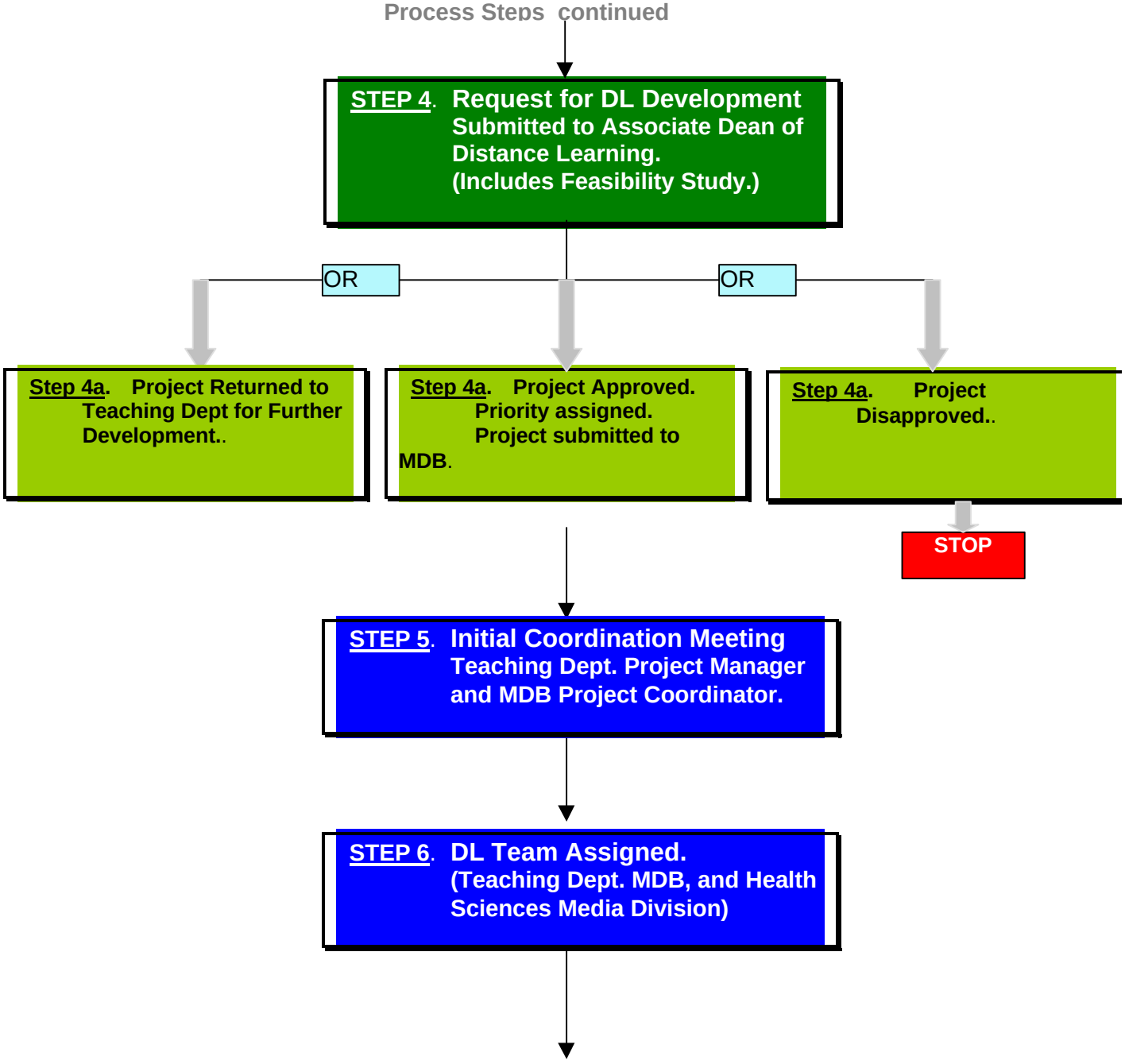

DEPARTMENT OF DISTANCE LEARNING ORGANIZATIONAL CHART
Associate Dean for Distance Learning
Department of Distance Learning
Multimedia Development Branch
Distance Learning Training Branch
Operations
Team A – IMI Development
Team B – IMI Development
Individual Training Products
TNET Broadcasting Facility
Learning Resource Centers
Digital Training Facilities
Budget
Acquisitions
Contract Management
USAR Reserve Component Liaison
FBA Coordination

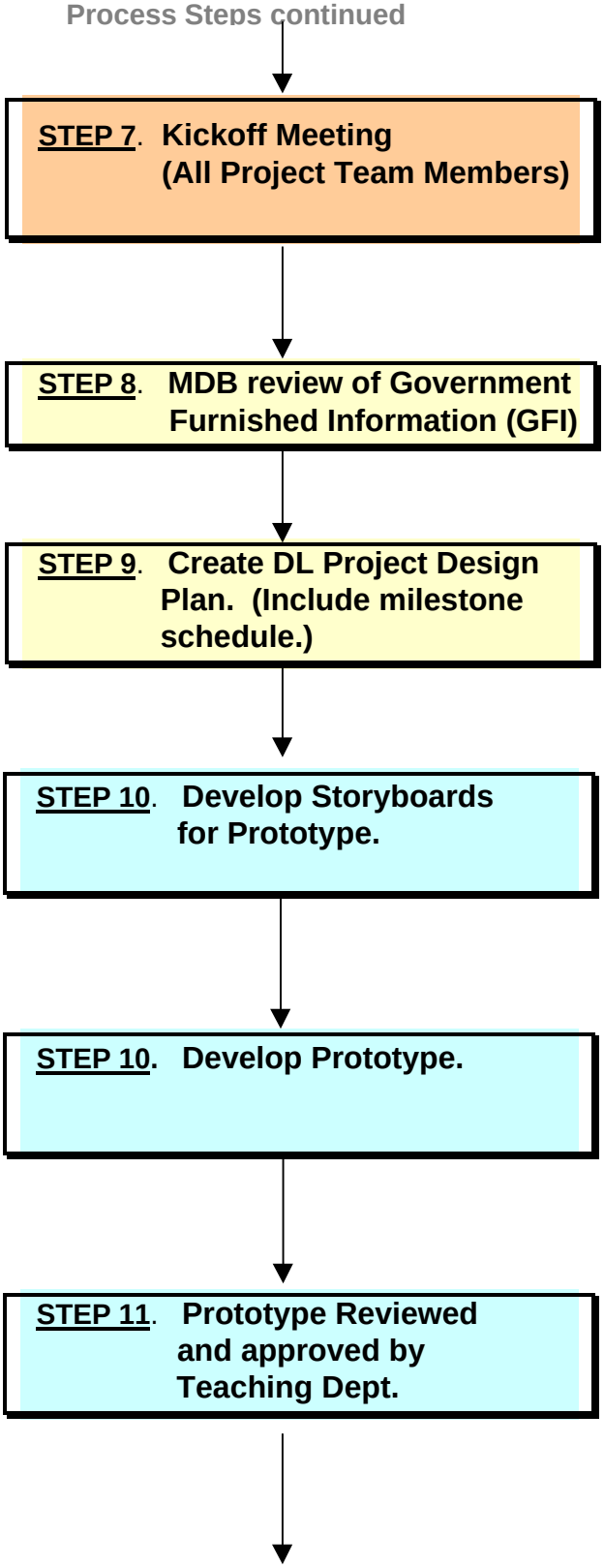
Chapter 2 INTERACTIVE MULTIMEDIA INSTRUCTION (IMI) DEVELOPMENT PROCESS

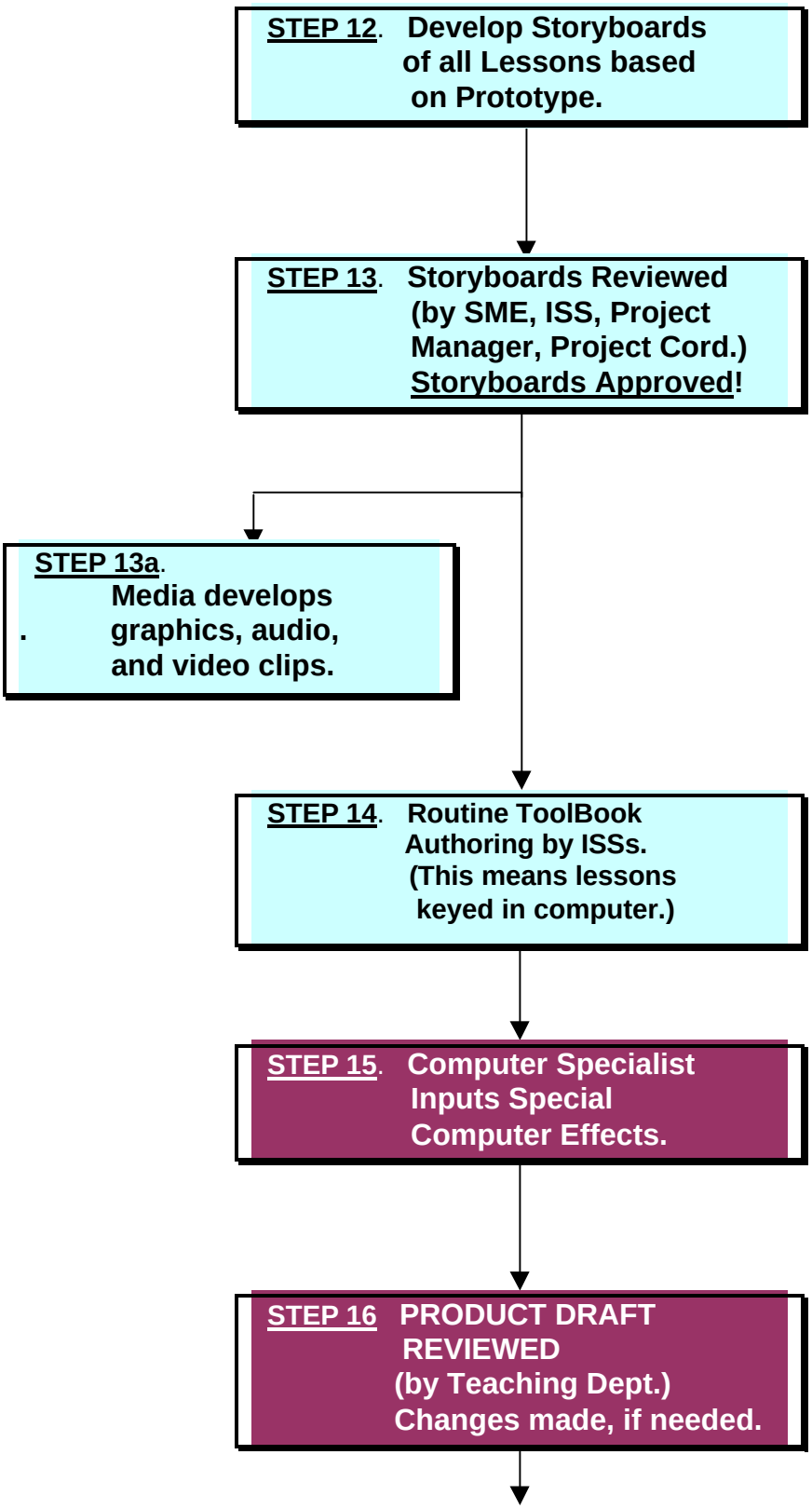
INTERACTIVE MULTIMEDIA INSTRUCTION (IMI) DEVELOPMENT PROCESS STEPS

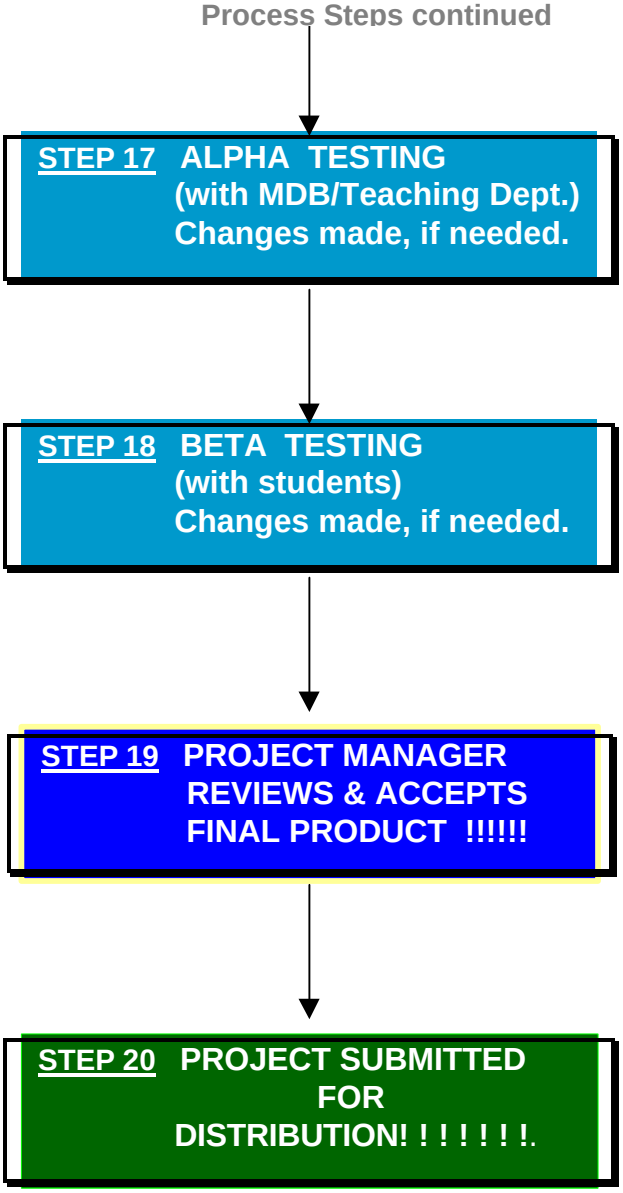
These are the major steps in the process with the initial point of contact included. This process is a guide with steps, which can be adjusted to meet the needs of a DL team.




STEP 4. Request for DL Development Submitted to Associate Dean of Distance Learning. (Includes Feasibility Study.)
OR
OR
Step 4a. Project Returned to Teaching Dept for Further Development..
Step 4a. Project Approved. Priority assigned. Project submitted to MDB.
Step 4a. Project Disapproved..
STOP
STEP 5. Initial Coordination Meeting Teaching Dept. Project Manager and MDB Project Coordinator.
STEP 6. DL Team Assigned. (Teaching Dept. MDB, and Health Sciences Media Division)

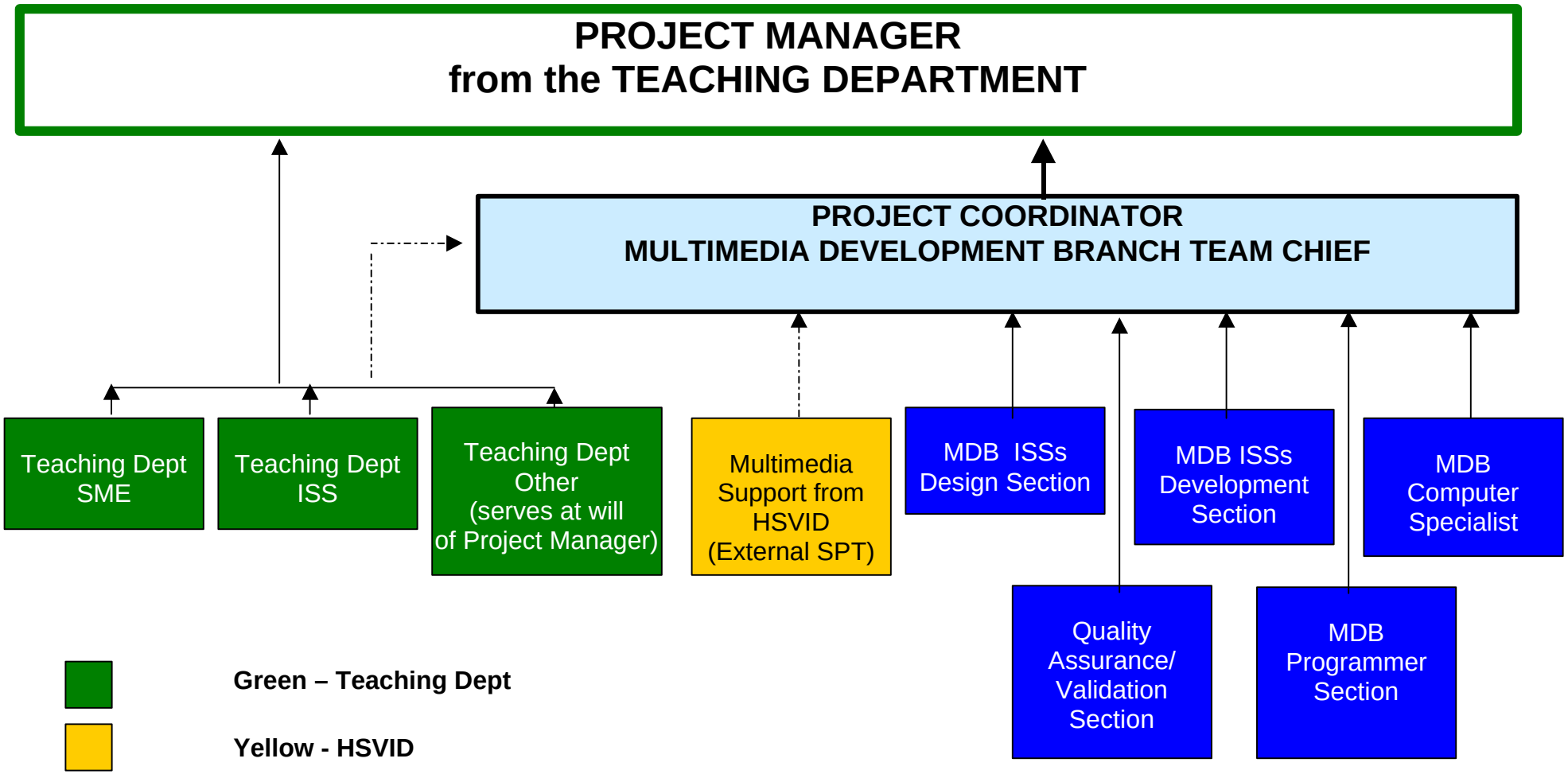

STEP 7. Kickoff Meeting (All Project Team Members)
STEP 8. MDB review of Government Furnished Information (GFI)
STEP 9. Create DL Project Design Plan. (Include milestone schedule.)
STEP 10. Develop Storyboards for Prototype.
STEP 10. Develop Prototype.
STEP 11. Prototype Reviewed and approved by Teaching Dept.


STEP 12. Develop Storyboards of all Lessons based on Prototype.
STEP 13. Storyboards Reviewed (by SME, ISS, Project Manager, Project Cord.) Storyboards Approved!
STEP 13a. Media develops graphics, audio, and video clips.
STEP 14. Routine ToolBook Authoring by ISSs. (This means lessons keyed in computer.)
STEP 15. Computer Specialist Inputs Special Computer Effects.
STEP 16 PRODUCT DRAFT REVIEWED (by Teaching Dept.) Changes made, if needed.



PROJECT SUCCESSFULLY COMPLETED

INTERACTIVE MULTIMEDIA INSTRUCTION (IMI) DEVELOPMENT SCHEMATIC



Green – Teaching Dept

Yellow - HSVID

Blue - MDB

NOTE. Arrows indicate main lines of communication within the DL team. Actually, various team members work with each other throughout project development

Chapter 3 ROLES AND RESPONSIBILITIES

INTERACTIVE MULTIMEDIA INSTRUCTION PRODUCT TEAM (IMIPT) ROLES AND RESPONSIBILITIES

COURSE DIRECTOR

- Selects the Project Manager from Teaching Department personnel.

PROJECT MANAGER
Teaching Department

- Writes Project Plan.
- Ensures availability of SME and Department ISS support.
- May serve as an SME.
- Identifies factors impacting development time and costs.
- Reviews and approves templates, scripts, storyboards, and IMI lessons.
- Approves screen identification system for use during quality control and testing.
- Resolves project glitches involving the Teaching Department.
- Provides students for courseware validation – (Beta testing).

PROJECT COORDINATOR
Multimedia Development Branch (MDB)

- Coordinates overall project for team.
- Assists Project Manager in finalizing the project plan.
- Develops project timelines, monitoring and tracking development events.
- Ensures that project is developed in accordance with timelines.
- Schedules and manages IPRs for IPRs for Department of Distance Learning (DDL) and MDB staff, as appropriate.
- Prepares meeting agendas and e-mails to project team members three days prior to team meeting.
- Schedules and presides at in-process reviews (IPRs) on IMI project, as needed.
  Briefs MDB Chief orally and in writing on status of projects and issues impacting timely completion.
- Reviews and approves final IMI lessons and products.
- Resolves glitches in project development.

SUBJECT MATTER EXPERTS (SMEs)
Teaching Department

- Prior to request for IMI project, conducts DITIS/DAVIS and Reimer Library searches for existing IMI products.
- Provides content-correct, government furnished information (GFI) and materials (e.g., lesson plans, references, and corresponding digital files) to MDB Instructional Instructional Design Section. (Notes whether government has copyright for materials as applicable.)
- Defines the job requirements (tasks and requisite skills and knowledge).
- Writes test items IAW authoring tool limitations.
- Writes scenarios as required.
- Provides ideas and content for storyboards to include photos/pictures for graphics or line drawings.
- Provides supplies and equipment and soldiers correctly attired when needed for graphics or audiovisual production.
- Reviews storyboards and ensures storyboards have been implemented properly (for content) during data entry/programming.
- Reviews final product for subject content accuracy.

INSTRUCTIONAL SYSTEM SPECIALIST (ISS)
Teaching Department

- Ensures all objectives for subject matter are correct.
- Reviews scripts and storyboards to ensure training material meets the stated objectives.
- Evaluates tests and exercises to ensure transfer of knowledge.

INSTRUCTIONAL DESIGN SECTION
Multimedia Development Branch

Lead

- Coordinates progress throughout the design phase.
- Assigns work among design team members (Lead Designer).
- Solves glitches that arise during course analysis.

Lead and Other Section Members

- Reviews and assesses Government Furnished Information (GFI); e.g., lesson plans, references, digital files.
- Creates overall course design plan.
- Creates lesson format (pattern of instructional material, knowledge checks, reviews, practice test items, etc.)
- Works with Graphic Artist and Computer Specialist to create screen layout, screen design, and text and color attributes for IMI project.
- Develops storyboards and scripts.
- Develops instructional strategies.

INSTRUCTIONAL DEVELOPMENT SECTION
Multimedia Development Branch

Lead

- Coordinates progress through the development phase.
- Assigns work among development team members (Lead Developer).
- Solves glitches that arise during development phase.

Lead and Other Section Members

- Develops testing strategies.
- Assists SMEs in designing appropriate test items for IMI course.
- Creates prototypes and templates in coordination with Graphic Artist and Computer Specialist.
- Coordinates with SME in selecting appropriate graphics, video clips to illustrate teaching points.
- Performs routine computer authoring of IMI lessons using ToolBook Assistant.

GRAPHIC ARTIST (HSMD)

[currently from Electronic Multimedia Imaging Center (EMIC)]

- Develops graphic images to include illustrations, technical drawings, title and animation frames.
- Works with MDB Instructional Design Section to create screen layout, screen design, and text and color attributes.
- Develops graphics based on reference materials and descriptions provided by Instructional Designers and SMEs.
- Catalogs computer graphic images and maintains a reference file of computer graphic images.
- Creates a logical naming convention system for graphic file photos, line drawings, etc. and maintains thumbnail sketches of the same for easy reference.
- Consults with Instructional Design Section.
- Implements all necessary enhancements IAW descriptions specified in the storyboards.
- Follows instructional design guidance from the Lead Instructional Designer.

AUDIOVISUAL PRODUCTION SPECIALIST

[currently from Television Production Branch]

- Reviews requirements for video production and advises regarding audio and visual options.
- Coordinates motion and still photographic support.
- Coordinates audiovisual production support.
- Coordinates audio narration.
- Provides audio/video enhancements to reinforce the instructional materials.
- Provides required sound files or movies.
- Reviews audiovisual production for media quality.
- Records all video.
- Works closely with the instructional designers, instructional developers, computer specialist, and graphic artist.

LEAD PROGRAMMER

- Performs coding functions.
- Creates programming and/or codes for all the IMI lessons.
- Advises team of the capabilities and limitations of authoring tools.
- Develops most efficient coding strategies and user nomenclatures.
- Based on storyboards, devises the most efficient coding strategy and user interface.
- Develops and implements screen identification system for use during quality control in conjunction with Department/ Branch SMEs and ISSs.

LEAD COMPUTER SPECIALIST

- Designs software specifications to ensure the course will run on specified hardware (Virtual Schoolhouse and Librarian).
- Develops complex instructional interactions.
- Develops screen identification system for use during quality control and testing.
- Develops subject content templates and macros.
- Performs advanced computer authoring (ToolBook Instructor).
- Performs ALPHA testing to ensure compatibility of courseware with student platforms (debugging).
- Performs technical validations of IMI courseware.
- Inputs approved IMI product into MDB archive database.

QUALITY ASSURANCE/ VALIDATION SECTION

Lead

- Arranges for a computer specialist to be on hand to solve computer glitches during validations.
- Schedules classrooms for Beta testing of IMI courseware (room reservations, etc.)
- Develops the project validation plan.

Lead and Other Section Members

- Monitors all quality control and testing procedures.
- Reviews and approves the screen identification system developed by the computer specialist and SME for use during quality control and testing.
- Assists Teaching Department SMEs and ISSs in executing the project validation plan.
- Assists students in registering on Virtual Schoolhouse and registers students prior to small group trials if numbers rather than names are used for target audience.
- Coordinates loading/testing of IMI courseware prior to validation.

Chapter 4 INSTRUCTIONAL DESIGN GUIDELINES

Interactive Multimedia Instruction (IMI) Courseware Design Guidelines

These guidelines are provided as a tool to assist courseware designers and developers in designing and developing IMI courseware. They include design strategies, conventions, and standards that provide a consistent approach to IMI courseware design.

Specific elements of courseware design discussed in this document include the topics listed below.

1 Menus and Sub-Menus
2 "HELP" Button
3 Motivation Factors
4 Writing Style
5 Lists
6 Numbers
7 Screen Design
8 Text
9 Computer Text File
10 Highlighting
11 Computer-generated Graphics
12 Testing Guidelines
13 Test Construction
14 Test Delivery: Multiple Choice Questions
15 Test Delivery: Matching Questions
16 Test Delivery: Performance Questions
17 Feedback and Review

1. Menus and Sub-Menus

a. Design the IMI courseware to be menu-driven so that the student can see a list of options (text or graphically) and select from the list.

b. Design menus that are simple, concise, logical, and easy to read.

c. Design the course with no more than three or four menu levels.

d. Design sub-menus to allow the student to return to the previously higher level menu. Use a menu icon on each sub-menu to provide this capability.

e. Use a minimal number of sub-menus and enable a hot key to the main menu without backing out through sub-menus.

f. Make all menu selections accessible to the student or use a color coding scheme to identify the selections available.

g. Use titles on all menu screens (main and sub-menu) to provide the student immediate information about his or her location within the course.

h. Provide color coded status indicators on the menu screen to show a student the lessons, modules, etc., which have been completed.

i. Maintain a uniform look for all parts of the course and ensure that all items (e.g., directions to the user, feedback, navigation buttons) appear consistently on each screen.

2. "HELP" Button

a. Include a "HELP" button on the screen which is available at all times except during testing.

b. Ensure the "HELP" button returns the student to the exact point in the course where the help request was initiated.

3. Motivation Factors

a. Design the course in small enough modules or lessons so that the student can easily exit the training session when desired. If the module is complex, make the lessons within the module short. If the module is simple, make the lessons within the module longer.

b. Use challenges and/or competition to increase curiosity and interest (e.g., select scenarios that have a real-life risk involved or give the student points for the correct action and subtract points for an incorrect action).

c. Provide positive feedback to the student.

4. Writing Style

a. Use active voice and write in the present tense.

b. Create a glossary that defines acronyms and terms. Examples: SAT: Systems Approach to Training; Digitize: to register a visual image or real object in a format that can be processed by a computer; to convert analog data to digital data. (Courtesy SALT: Society for Applied Learning Technology).

c. Hotlink lesson content to glossary.

d. Explain what an acronym stands for the first time you use it in the lesson. For example: "All Instructional Systems Specialists (ISSs) are trained in the use of the Systems Approach to Training (SAT). The SAT process allows the ISS to produce consistent lessons every time."

e. Define terms the first time they are used. Example: Resolution: the sharpness or clarity of a computer screen. (Courtesy SALT).

f. Capitalize proper names, words used as an essential part of proper names, abbreviations/acronyms, and titles (or rank) that precede a proper name.

g. Write in short sentences and use concrete terms.

5. Lists

a. List items down the screen, not across.

b. Use bullets or boxes for lists of items that are not sequential. Use numbers for sequential, step-by-step, or prioritized lists.

c. Skip a line between the stem and the first item in the list.

d. End the stem with a colon if it is an incomplete sentence. For example:

(1) The differences between a computer monitor and TV screen include:
   (a) screen ratio.
   (b) scan lines.
   (c) resolution.

e. Make items in a list either all incomplete sentences or all complete sentences.

f. **DO NOT** use periods after incomplete sentences, unless they complete the sentence began at the stem.

g. Make all the items in a list one kind when appropriate (e.g., all nouns, all verbs, all positive, all negative, etc.).

h. Capitalize the first letter of each item in a list.

i. Avoid listings that are more than one text screen in length. If not possible, indicate that there is more to follow and that subsequent screens are continuations.

6. Numbers

a. When counting, start with one; when measuring, start with zero.

b. Use digits if the number is more than ten, refers to a specific value on the screen, or is one in a list.

c. Spell out the words for a whole number if the number begins the sentence, is less than ten, introduces a number list, counts something as opposed to measuring it, refers to something that already contains a digit, or refers to an approximation rather than an exact count or measure.

7. Screen Design

a. Ensure opening pages present course title, security classification, instruction for providing feedback on course quality and course menu.

b. Page numbering: The first page of each lesson, test, or exercise should be named “START” in ToolBook , then numbered. Subsequent pages should be numbered sequentially. The following prefix letters are to be used to indicate the type of page.

e. Place icons on the screen in consistent locations.

f. Provide instructions to the user at the top of the screen.

g. Provide transition or supplemental information in the center of the screen.

h. Provide feedback horizontally and toward the bottom of the screen.

i. If size of the item is important, provide a frame of reference (e.g., hand, ruler, person in background, etc.).

j. Place important items in the foreground of a display.

k. Use systematic, organized screens. (See Appendix G for examples.)

l. Ensure each screen presents one main point, idea, step or action.

m. **DO NOT** use side-by-side (columnar) presentation of text.
When an important point about a visual or graphic needs to be emphasized, be sure it is explained in detail in the text of the lesson.

n. Use headings as necessary to clarify the visual displayed or the content being covered. Headings should generally appear at the top of the screen and call attention to themselves by use of capitalization, font, size, and/or color.

o. When highlighting or pointing out an object on a video still or computer graphic, use an arrow.

p. Use the first and last screens of a module to introduce and reinforce the key points of what has been presented. Use short sentences written at a more general level than the actual training objectives for the module**. DO NOT** use the specific content of the module.

q. Use bullet statements instead of complete sentences to present large amounts of text information.

r. Allow some blank space on the screen; use space to group items on a page.

s. Consider using video or graphic window-inserts to show extreme close-ups of small objects (knobs, keys, etc.) in the context of a wider-angle view.

t. Keep the sound and the pictures on the same subject. The sound should complement the text/visual/graphic, not just read what's on the screen.

8. Text

a. Use a san serif font. San serif is a category of typefaces that do not use *serifs* (small lines at the ends of characters). Popular san serif fonts include Helvetica, Avant Garde, Arial, and Geneva. According to most studies, serif fonts are more difficult to read.

b. Use text color combinations and background colors with the standard 256 colors at a resolution of 800 x 600. Use a light text on a dark background. Reference: MEDCOM PAM 25-90.

c. **DO NOT** use distracting "hot" colors that pulsate on the screen (e.g., red, pink, magenta).

d. **DO NOT** start a sentence on one screen and finish it on the next.

e. Use upper and lower case letters for readability in all screen headings and text.

f. Place all text in a contrasting color bar or box, to the side, top, or bottom of, not directly on, the video image.

g. Use a border around the color bar/box to make it stand out from the video or graphic image.

h. Limit use of boxes (that trap the eye of the student), all italics, and all capitals (italics and all caps are hard to read on screen).

i. Change background colors only to assist instruction. For example: use consistent text and background colors for all screens in the "Information" section and for all screens in the "Review" section.

j. Place text that points out an object near that object.

k. Left-justify text, center WARNINGS, CAUTIONS, and NOTES, and bottom-left justify user directions such as button bars.

l. Require the student to "touch to continue" (light pen or touch screen), "press to continue" (keyboard), or "click to continue" (mouse) action to view sequential screens of text.

9. Computer Text Color

NOTE: Stick to colors soothing and pleasing to the eye for long term reading. Examples include dull blues, greens, and earthtones.

a. For user instructions, use yellow text on a blue bar at the top of the screen.

b. Place a feedback and/or review button at the bottom of the screen and hyperlink to the appropriate information.

c. For correct feedback, use text on a contrasting colored bar with a contrasting colored border around the bar.

d. For incorrect feedback and review, use text on a contrasting colored bar with a contrasting colored border around the bar.

e. For technical data notes, use text on a contrasting colored bar at the top of the screen with a contrasting colored border around the bar. Use all capitals for the caption "NOTE" and center on the top line.

f. For computer generated text menus, use a neutral color as the predominant color with a contrasting text color.

g. For test questions, use black text on a gray background. Use boxes or bullets to differentiate the answers.

h. For critiques, use a color bar, similar to a palette, as the rating scale. Make each color block correspond to a rating value and be a touch point. Show the numerical value of each touch block(e.g., Blue = 0, Gray = 1, Green = 2, etc.).

i. Ensure the colors of text, bars, and borders are different for each category listed above and remain consistent for that category throughout the course.

10. Highlighting

a. Use color to highlight and emphasize important points. Insert pop-up windows to present additional information.

b. When using color for highlighting, use standard color conventions. Examples: dull, dark red or maroon (bright red bleeds on screens) for Danger, orange for caution, etc..

c. When using size for highlighting, the minimum size differential is 1.5 times normal size.

d. Minimize the highlighting of key words in text information.

e. **DO NOT** use blinking or moving text (e.g., scrolling text, marquees, continuous animation).

11. Computer-generated Graphics

a. When using colors of equipment, use the color of the actual equipment as closely as possible.

b. Allow the student control of initiating animation sequences or at least the ability to repeat them.

c. Use enough colors to show discriminations or distinctions, but avoid unnecessary use of colors.

d. Use contrasting colors to convey distinctions between objects and similar, but distinctive, colors to convey similarity.

e. Avoid unnecessary ornamentation, patterns, or effects. (For example: crests, unit flags and identification go on title page/screen only. Do not place ghosted or screened down graphics on page/screen backgrounds. Use plain colors for pages, not tinted or colors that change from dark to light. Do not take up screen space by repeating lesson title on every page.

f. Use spacing between graphic objects to separate objects into logical groups and achieve balance.

g. Use graphics/text for small things that are subject to multiple uses or frequent change within the course.

h. Try to avoid horizontal lines one pixel in width to reduce jitter.

i. Use first generation video/visuals to ensure quality whenever possible.

j. Provide a legend for any nonstandard color-coding.

k. Treat labels on a graphic as part of the graphic, but display them on the screen last. Exception: For video graphics, add labels with the authoring system for better clarity.

l. Place graphics on the screen before any text or captions. Background colors appear first, then the graphics, any captions, and text. If audio is levels used, it begins after the text has appeared.

m. Break down large or complex graphics so that they appear on the screen in readable sections.

n. A drawing or section of a drawing will be drawn in layers starting with the layer furthest from the viewer (background) and finishing with those items closest to the viewer (foreground). This adds to the dimension and perception of depth.

o. If motion is the focus of a graphics animation, the animation will not begin until the entire display appears. Prompt the student to initiate the animation and view the motion.

p. If the results of a motion are the focus of a graphics animation, the animation should occur prior to the drawing of the text. The object to be animated should be the last item that is drawn prior to the timed animation sequence. After the animation sequence, add labels, captions, and text. Give the student the capability to repeat the animation segment and view the sequence.

12. Testing Guidelines

a. All tests. When the student selects an item as an answer, identify the selection (e.g., checkmark, circle, box, color change, etc.) using highlighting or ghosting.

b. Final examinations.

(1) Do not allow the student the capability to move around throughout the test or change an answer before it is scored after he has moved on to the next question.

(2) Develop a sufficient test bank to support several different tests for testing the learning objectives.

(3) Inform the student of how many questions will be given, the approximate amount of time that should be needed to complete the test, and if any questions are weighted differently.

(4) If the test is to be on the Web, test the material in both browsers (Netscape and Internet Explorer).

c. Test other than final examinations (practice tests, internal test items).

(1) Following each test, show the student the results, and then branch him or her to the appropriate menu to select another module or lesson, additional practice, exit, etc., as applicable.

(2) Provide the capability for the student to review the questions missed and refer for review.

13. Test Construction

a. Relate each question directly to a learning objective.

b. Create more than one question per objective for use in random tests or other test versions.

c. Create clear and concise test questions.

d. **DO NOT** put more than one question on a screen, unless it is a matching exercise.

e. Make each test question totally independent.

f. Create questions appropriate to the type of learning desired for that objective.

g. Ensure questions address key points.

h. Test all safety related items, especially in progress checks and posttests. However, test them only once per type of test, even if those items are duplicated in other modules. **DO NOT** test the same "WARNING" in all pretests for the modules that it applies to.

i. Create questions that are relevant to the student's work environment. Avoid classroom-type questions like "What are the three main ideas…?"

14. Test Delivery: Multiple Choice Questions

a. Present multiple choice questions with at least four choices.

b. Number the test questions (if not using random generated test questions).

c. Use parallel, grammatical construction for the answers.

d. Use answers similar in length.

e. Use short answers as much as possible.

f. Include repetitive phrases in the stem rather than in each answer.

g. Avoid negatives in the stem. If they must be used, highlight them by using all capitals or a different color.

h. **DO NOT** use distractors such as "all of the above," "none of the above," or "both b and c."

i. Use a random number generator to determine the position of the correct answer to avoid bias.

15. Test Delivery: Performance Questions

a. **DO NOT** allow the student to make a mistake and then correct it after he has left that page.

b. **DO NOT** provide feedback during the test, either correct or incorrect.

c. Ensure the step numbers required in the performance of a task match the step number in the question.

d. Provide the student with information on how the answer will be evaluated.

e. **DO NOT** use either the time or the number of steps required to complete the task for evaluation criteria unless it is specifically mentioned in the question and related objective.

16. Feedback and Review

a. Include a “Review” section in all IMI**.**

b. **DO NOT** use negative feedback such as abuse or ridicule.

c. Whenever possible, ensure feedback or review is specific to the action the student is trying to perform.

d. Avoid slang or jargon feedback (e.g., “right on,” “too bad”, etc.).

e. Correlate the level of feedback and review to the difficulty of the action or question. If questionable, provide more rather than less.

f. Any incorrect response to a simple “identify” or “recall” question requires only an indication of the correct answer.

g. Any incorrect response to a simple procedural step such as “apply power” may require only pointing out the correct response. Example: “This is the power switch.”

h. The incorrect response to a theory, concept, or decision question may require more review.

i. Provide feedback and review to incorrect responses on actions that involve safety in terms of the consequences. Example: “Connecting this cable lead this way will burn out the tester. Try again.”

j. Use other techniques to provide adequate review (e.g., reword or rephrase the information you are attempting to convey, or use another media technique such as audio, graphics, motion, etc.).

Chapter 5 VALIDATION AND TESTING

OVERVIEW

Validation is the process used to determine if a product accomplishes its purpose efficiently and completely. The validation serves as the final check for the instructional validity and effectiveness of the lesson objectives, design, structure, instructional materials, and tests. Validation is a quality control process and should be conducted IAW TRADOC regulations and guidelines. The teaching department and the Multimedia Development Branch share the validation responsibilities. The validations are performed at the lesson level.

As the Interactive Multimedia Instruction (IMI) lessons/modules are completed and before releasing them for beta testing with students, the IMI team should alpha test all lessons to check for operational and navigational errors. The review checklists go to the appropriate team member for corrections, the corrections are reviewed and approved, and course development can continue.

After all required changes are made and re-evaluated, it is the responsibility of the Teaching Department and the MDB Validation, Evaluation and Testing Cell to beta test the material with students to ensure educational effectiveness (transfer of knowledge) and return on investment. This consists of administering the IMI lesson, gathering and analyzing test data, computing the results of the test data on a group level, and gathering subject attitudinal data regarding the IMI.

A validation plan should be written for all IMI development. This validation plan should describe how the courseware will be evaluated to determine its efficiency and effectiveness as a training tool and to provide information about the validation process recommended for the project. The personnel responsible for preparing for validation, those conducting the validation, as well as the end users of the validation data, will use this document as a guide to the process and outcomes of the validation.

APPENDIX A

Teaching Department Checklist
For
Distance Learning Projects

1. **The following checklist will help you determine if you are ready to begin development of an interactive multimedia instruction (IMI) product.**

2. **Please contact _____(name) _____, _____organization_____, _____ [phone number] _____ if you have questions about this checklist or about distance learning products.**

	ITEMS	RESPONSE	
1	Do you have current reference materials (e.g., lesson plans, POIs, technical manuals, field manuals, etc.)?	Yes	No
2	How many lessons/modules/hours are in the course you want developed in a distance learning mode?		
3	How do you want your product delivered (e.g., via the web, CD-ROM, combination of web-based and CD-ROM)?		
4	What is your timeframe for implementation (e.g., 6 months, 1 year, etc)?		
5	What is the expected level of interactivity (Level 1, Level 2, and Level 3)? [MDB can do levels 1 and 2.] Lessons can be at different levels.} – TRADOC definitions furnished.		
6a	Do you have copyrighted materials?	Yes	No
6b	If so, do you have permission to use them?	Yes	No
7	Do you have the graphics you want to use in digitized format or hard copy?	Yes	No
8	Will you have a project manager assigned for the duration of the project?	Yes	No
9	Will you have an SME assigned for the duration of the project?	Yes	No
10	Will you have an ISS from your department available to assist with this project?	Yes	No
11	Do you have funds available to support this DL development?	Yes	No

DAVIS/DITIS Search Checklist

1. Background: Defense Automated Visual Information System (DAVIS) and Defense Instructional Technology Information System (DITIS) are the databases used to manage DOD visual information, IMI production and activities to facilitate resource sharing within DOD. It includes non-local data on visual information production, procurement, inventory, distribution, and project status and an on-line catalog of IMI used in military training. It also contains information on all DOD-owned IMI, whether fielded or under development. The system's database must be accessed to identify IMI for review to determine if it meets, or can be cost effectively modified to meet, your IMI training development requirement.

2. The DAVIS/DITIS search produces a printout of all DOD and Federal agency products to which DOD currently has reproduction rights, are under development, or are planned. The printout will include the search number, the key words used to conduct the search, and a list of product titles (if any) that match your key words. Follow these steps to conduct the DAVIS search:

Step	Action
1	Select the key words to be used in the subject area search. You can use an unlimited number of key words. Examples: Bradley Fighting Vehicle alcohol, or leadership.
2	Search the DAVIS/DITIS at the following website: **http://afishp6.afis.osd.mil/dodimagery/davis/**
3	Review results of the search. Did the DAVIS/DITIS search identify any products? • If related products are found, complete Steps 4 and 5. • If related products are NOT found, complete Step 5.
4	Determine if the identified products are applicable and suitable for the planned production by- • Obtaining a copy of each identified product. • Reviewing each product to decide if it can be used or revised to satisfy the project requirement. • Annotating the results of the review beside the product title on the DAVIS search printout (e.g., Out of date, Subject not pertaining to the Army, Incorrect model of equipment).
5	Include the DAVIS/DITIS search results as an attachment to the request for DL development submitted to the Associate Dean, DDL.

APPENDIX B

IMI Product Review Checklists

Introduction: The following IMI Product Review Checklist should be used by IMI development teams to evaluate and improve the quality of any IMI product.

Directions for Use: Place a check in the middle column if the corresponding guideline is included in your IMI courseware. If a guideline does not apply, indicate so with "N/A" for not applicable. Document with comments where appropriate.

IMI Review Checklist

General Principles	√	Comments
1. The courseware is user-friendly.		
2. The courseware is menu-driven.		
3. A browsing alternative is provided.		
4. Help functions are provided.		
5. Student record tracking is provided.		
6. Messages are provided when the wait to get a response is long.		
7. Information is positioned appropriately on the screen (location of key information and menu bar).		
8. Cues are provided to indicate completion of an instructional segment.		
9. The authoring system is capable of implementing all features designed.		
10. The courseware provides clear instructions on how the student is to respond.		
11. Screens are not cluttered.		
12. Methods are used to orient students (e.g., placement of information, consistency of screen layout).		
13. Color is used appropriately.		
14. When simulating equipment, realistic colors are used and directions related to the simulation are placed in boxes/windows.		
15. Practice provided is appropriate for the content type.		
16. Objectives provide complete coverage of content to be taught.		
17. Instruction and test items correlate with the objectives.		

IMI Review Checklist (continued)

Information to be included in a storyboard	√	Comments
1. Identification information is complete.		
2. Programming notes are complete.		
3. Audio script is complete.		
4. Video information is complete.		
5. Graphic and animation information is complete.		
6. Text information is complete.		

Interactivity	√	Comments
1. Courseware provides frequent opportunities for meaningful interaction.		
2. Content is chunked into small segments and questions (with feedback), periodic reviews, and summaries are built in.		
3. Numerous questions are included, but do not interrupt the continuity of the instructional flow.		
4. Questions follow the instruction to force students to search for and review necessary information.		
5. Students are asked questions related to content that has been taught, requiring them to use previously learned knowledge to answer them.		
6. Questions are at the application rather than the memory level.		
7. Rhetorical questions are included to get students to think about the content, to stimulate their curiosity, or as a transition between frames.		
8. Opportunity is provided where the student may discover information through active exploration.		

Learner Control	√	Comments
1. Students are given the appropriate amount of learner control.		
2. Students are always given control over the following elements: pacing, support information, navigation, and termination.		

IMI Review Checklist (continued)

Feedback	√	Comments
1. Feedback is on the same screen with the question and student response.		
2. Feedback immediately follows the student response.		
3. Feedback verifies correctness and explains why.		
4. For incorrect responses, students are given a hint and the opportunity to try again.		
5. Feedback is positive and does not encourage incorrect responses.		
6. In a simulation, instructional feedback is provided in addition to simulation responses.		

Audio	√	Comments
1. The script is appropriate for the target audience (language, knowledge, and vocabulary) and chunked appropriately.		
2. The style and tone are appropriate for the target audience.		
3. The script is conversational in nature and is short and simple.		
4. Only relevant information is included in the script.		
5. The script language is simple, active, and direct.		
6. Abbreviations, technical jargon, unfamiliar terms, and ambiguous words are avoided or defined if used.		
7. Transitions are clear.		
8. Every piece of audio has a corresponding visual and the audio supports the visual.		
9. There are no long pauses in a visual waiting for an extended audio to finish. No audio segments are longer than 20 seconds.		
10. Audio pace is varied. There are breaks of silence to bridge scenes and process information.		
11. Subtle sound effects are used as cues.		

IMI Review Checklist (continued)

Video	√	Comments
1. Sketches of shots, camera lenses, angles, and movements are included.		
2. The motion video format used is appropriate for the content (e.g., demonstration, simulation, and lecture).		
3. Video and audio reinforce each other.		
4. Repetition is used judiciously. Only critical information is repeated.		
5. No video sequence lasts longer than 20 seconds.		
6. The visual message (e.g., graphics, animation, still frame, step stills, motion video) is appropriate for the content.		
7. Program appropriately uses motion video versus still frame and step stills.		

Programming	√	Comments
1. Programming acronyms are defined.		
2. Program standards are followed (e.g., screen type, screen layout, questions and feedback, sequence of presentation within subjects).		

Graphics/Animation	√	Comments
1. Use of graphics/animation is appropriate for the content.		
2. When appropriate, video is used following a graphic to enhance learning transfer.		
3. Biases or stereotypes in graphics and animation are avoided.		
4. Exaggeration and humor are used appropriately to heighten student interest and to facilitate recall.		
5. Original rendered graphics/animation is kept in historical file to update courseware.		

IMI Review Checklist (continued)

Text Display	√	Comments
1. Paragraphs start with main idea and follow with topically related text.		
2. The first sentence in a sequence is short.		
3. New idea is introduced with information the student already knows.		
4. Complete words are used, not contractions.		
5. Cautions and exceptions come before the instructions.		
6. Text is broken into discrete paragraphs and units.		
7. Text is left justified (no right justification). Headings and titles are centered.		
8. Paging (not scrolling) is used for large amounts of text.		
9. Upper case is used only for emphasis and titles.		
10. Hyphens are not used except for compound words.		
11. Punctuation is omitted for abbreviation, mnemonics, and acronyms.		
12. Displays are predictable and regular. Textual cues and messages to the student are consistent.		
13. Paragraphs are separated by a blank line.		
14. Standard alphabetic characters are used. Only symbols known or being taught are used.		
15. There is plenty of white space separating blocks of information.		
16. Information is chunked appropriately.		
17. Only relevant information is included in the script.		

IMI PROJECT APPROVAL SHEET

EVENT	SIGNERS
◆ **Completion STEP 9**. Project Design Plan	**MDB Project Coordinator** _____ **TD Subject Matter Expert** _____ **TD Project Manager** _____
◆ **Completion STEP 11** PROTOTYPE reviewed and approved by Teaching Dept.	**MDB Project Coordinator** _____ **TD Subject Matter Expert** _____ **TD Project Manager** _____
◆ **Completion STEP 13** STORYBOARDS reviewed and approved by Teaching Dept.	**MDB Project Coordinator** _____ **TD Subject Matter Expert** _____ **TD Project Manager** _____
◆ **Completion STEP 16** FINAL DRAFT PRODUCT reviewed and approved by Teaching Dept.	**MDB Project Coordinator** _____ **TD Subject Matter Expert** _____ **TD Project Manager** _____
◆ **Completion STEP 19** FINAL PRODUCT reviewed and approved by Teaching Dept.	**MDB Project Coordinator** _____ **TD Subject Matter Expert** _____ **TD Project Manager** _____

PROJECT PLAN (Sample Only)

For

(INSERT COURSE NAME AND NUMBER)

INTERACTIVE MULTIMEDIA INSTRUCTION (IMI) PRODUCTS

1.0 Project Summary

Development of (insert course name and number) Interactive Multimedia Instruction (IMI) lessons totaling XX hours of instructional content. These lessons will cover the competencies and skills required to function as (insert specific content). The (insert course name and number) instructional content will be developed in a (CD-ROM or web) format with registration and testing capabilities via the Virtual Schoolhouse. Glossaries and other material required for effective use of the IMI courseware will be included as annexes to the (insert course name and number).

2.0 Background.

2.1 The goal. The goal of the (insert name of department) is to provide standardized (initial/reclassification/sustainment) training of the highest quality for the Active and Reserve Components.

2.2 Target Audience. "The instruction will be designed for soldiers in the grade of E-5 and above who are being reclassified as Military Occupational Skill (MOS) 91J. These soldiers possess a minimum reading grade level of 9 and an average education level of 12 years or GED equivalency/" NOTE: The teaching department should describe its target audience providing the information given in this example.

3.0 Scope of Work and Specific Requirements.

3.1 Multimedia Development Branch (MDB) will develop XX Interactive Multimedia Instruction (IMI) lessons of high instructional quality, totaling XX ours of instructional content in a (CD-ROM or web based) format. The lesson titles and anticipated level of interactivity are listed in Attachment #1. Final determinations of acceptability of lessons produced will be made by the (insert name of teaching department).

3.2 MDB will be responsible for producing IMI, including instructional design, graphics production (video, photographs, illustrations), audio production, and evaluation of educational effectiveness, and delivery. All IMI lessons will be developed in accordance with (IAW) references listed in Attachment #2.

3.3 MDB shall use the latest version of Asymetrix ToolBook Assistant or Instructor to develop IMI courseware. Testing capabilities will be designed to be fully functional with both Internet Explorer 4.01 or later and Netscape Communication 4.05 or later. Hypertext Markup Language (HTML) version 4.0 or higher, JavaScript, and Java will be used to develop the components that run on the web.

3.4 IMI Development Team. An IMI development team will be established to design, develop, and validate the IMI courseware. The IMI Development Team will consist of personnel from the (insert name of teaching department) and the MDB to include:

3.4.1 (Insert name of teaching department) project manager.

3.4.2 (Insert name of teaching department) subject matter expert(s).

3.4.3 (Insert name of teaching department) Instructional Systems Specialist.

3.4.4 Multimedia Development Branch (MDB) project coordinator (team chief).

3.4.5 MDB Instructional Designers and Developers.

3.4.6 MDB Computer Programmers and Computer Specialists.

3.4.7 MDB Validation Coordinator.

3.4.8 Health Sciences Visual Information Division (HSVID) Media Support.

3.5 Course Design Plan. MDB in coordination with the department project manager and SME will develop a course design plan that will contain the overall course and lesson design flow and lesson objectives.

3.6 Student and Lesson Management. The management tools used to communicate lesson information and status will include bookmarking, lesson status within the course, time on lesson, test item results for item analysis, examination results, and lesson score. Other data items may be determined during development of the lessons.

3.7 Validation of Educational Effectiveness. MDB in coordination with the teaching department project manager, subject matter experts, instructional systems specialists, and other reviewers as designated by the (insert name of teaching department) project manager will evaluate the design, functionality, content, and educational effectiveness (transfer of knowledge) of each IMI lesson. MDB will conduct a large group validation on the final version of each lesson, and will modify the instructional design as required.

3.8 Future Updates. MDB will retain full, open, editable source code files for all IMI, storyboards, and graphic files plus all raw video and photographs as updates and modifications will be necessary in the future. An index of graphics, photographs, video clips, etc. with their related copyright releases, where applicable, will be retained in a electronic format.

3.9 Implementation on the Virtual Schoolhouse.

3.9.1 MDB will use the Aviation Industry Computer-Based Training Committee (AICC) standards for data interchange with the AMEDD's Virtual Schoolhouse.

3.9.2 MDB will work with the AMEDD systems administrator to install and validate the final courseware products on the Virtual Schoolhouse to ensure proper interface and function of the Course Management System and lesson tracking features in the IMI courseware.

4.0 **Product Development Specifications**

4.1 Computer Text. With the use of storyboards, MDB will maintain a consistent lesson appearance throughout each IMI lesson and within groups of related lessons. Hyperlinks and regular text characteristics such as color, size, font, style, placement, or use of capitalization will be consistent throughout the lesson.

4.2 Computer Graphics and Background. All graphics must be clear, complimentary to the content presented, and with a minimum of 256 colors for photographs and videos and multiple, distinct colors for artwork, graphs, and test.

4.2.1 When graphics are presented, they will show in a size that is easily readable, and the detail readily interpretable. When instructionally appropriate, graphics, forms, tables, and maps (grid, vicinity, and detailed definition) will have zoom in/out capabilities to provide a full screen view, which shows full graphic/form/table, general vicinity on a map, or enlarged details.

4.2.2 Graphic images must be GIF or JPEG format of a least 256 colors (where appropriate). Graphics must meet the minimum requirements as outlined in TRADOC Regulation 350.70 and TRADOC Pamphlet 350-70-2.

4.2.3 Scanned graphics or facsimiles used as graphics must be clear, readable, and in color when appropriate. Computer generated versions of documents and forms will contain enough of the details of the original to be an effective training aid.

4.2.4 Lessons will be developed for computer screen resolution of 800 x 600 Pixels.

4.2.5 Backgrounds of photographs and videos will not be cluttered or inappropriate for the scene being depicted. Background graphics will not detract from the message, nor interfere with the readability

4.2.6 Whenever duty military uniforms are included, they will be shown on all

graphics in a non-copyrighted version and will be current and appropriate for the situation.

4.2.7 Adherence to and use of proper safety precautions, devices, and personal protective equipment (PPE) must be evident in photographs when appropriate.

4.3 Computer-Generated Animation and Video. Action conveying moving objects will be used only when necessary for effective learning IAW TRADOC Pam 350-70-2. Analog videotapes and recordings will be converted from the first or second generation copy to Motion Picture Experts Group 1 (MPEG 1) at the highest compression format but maintaining the same high video quality for CD-ROM based material.

4.4 Audio Format. All CD-ROM based audio files will be no less than 16 bit, 22.05 kHz WAV format. All CD-ROM based synthesized files will be MIDI format.

4.5 Computer Delivery Platform. All IMI lessons will be developed to run in a Windows 95 and higher environment. The minimum platform will be 100 MHz Pentium PC with 32 MB RAM, 4X speed CD-ROM, 16 bit Sound Blaster-compatible sound with speakers or headphones, 2 MB video RAM with 256 colors, and 28.8K modem connection.

5.0 Development Tools.

5.1 Instructional Strategy. It is anticipated that IMI lessons will follow the general sequence of introduction, content, summary, and practice or appropriate learning activities. After a core of content is presented for each lesson, the style will include situations and scenarios in which the student can learn and practice analysis of situations, responses to situations, and problem solving. It is anticipated that these lessons will include branching according to specific scenarios, and that situation-based feedback and remediation will be used.

5.1.1 Lessons will include terminal and enabling learning objectives at the beginning of each lesson. Practice questions will be included within the lesson with remediation based on student performance.

5.1.2 The final product will include the following: tutorial and help screens

on how to use the courseware (e.g., navigation, points-of-contact at AMEDDC&S); a glossary with terms hyperlink form "hot" words as well as being accessible at any point; personnel in the (insert name of teaching department) and AMEDDC&S.

5.1.3 All lessons must track the student's progress within each lesson as well as from lesson to lesson or module to module and report this progress via the Course Management System (CMS) tool as specified in the Virtual Schoolhouse. Lessons will include hyperlinks to appropriate doctrinal and education references on the World Wide Web or on the CD-ROM.

5.2 Testing Strategy. Test items for the students generally will be randomly selected from test item databanks, although test strategy for selected objectives or content facts may be non-randomly selected. There will be a test item databank for each developed lesson, module and final course test. This test item databank will also be linked to the written exam-generating program, which can produce written exams in MS Word format.

6.0 Special Instructions. Should the use of copyrighted material be necessary, the (insert name of teaching department) will be responsible for obtaining permission to use, including paying any fees associated with obtaining the permission. Packaging and labeling will be IAW AR 25-71 and any other regulations or policies that may become effective before lessons are packaged and labeled.

7.0 Reviews. The (insert name of teaching department) review times will be 10 working days after receipt of each lesson item/stage to be reviewed.

7.1 The (insert name of teaching department) must approve a Project Plan with tentative milestone schedule and a course design plan for design conventions and specifications for the project as a whole before the lesson prototype is developed.

7.2 The (insert name of teaching department) must approve the lesson flowchart, storyboards, and graphics for each lesson before it is developed. MDB is responsible for quality control of the products (spelling, grammar, format correctness, etc.) before submitting any product for review.

7.3 A functional prototype of the first lesson must be approved by the (insert name of teaching department) before work proceeds on other lessons. Validation of a lesson prototype and the final draft IMI will include a complete technical test of the IMI to ensure functionality on the Virtual Schoolhouse. The MDB development team is authorized to observe classroom and field training before storyboard and production phase of IMI development. All visits must be coordinated with the teaching department project manager.

7.4 Validation of the instructional effectiveness of at least the final draft of each lesson by appropriate users/reviewers as designated by the (insert name of teaching department) project manager is required. A written survey will be developed by MDB

and used to collect feedback from all participants. A report of the corrections will be provided to the (insert name of teaching department) project manager.

8.0 Government Furnished Information (GFI)

The (insert name of teaching department) SME will provide technically accurate and current materials (e.g., references, digital files) to MDB before IMI development is initiated. No classified material will be used in the development of the IMI course. Unless otherwise indicated, all GFI will be returned to the Teaching Department upon completion of the project.

9.0 Milestone Schedule

The teaching department in coordination with MDB will develop a proposed milestone schedule within 10 days after the initial coordination meeting.

9.1 Course Design Plan. A proposed course design plan will be presented for review and concurrence to the (insert name of teaching department) project manager NLT 10 working days after the initial coordination meeting. Additional conversations prior to completion of the prototype may be necessary to complete all details of this plan. The course design plan may be modified during the course of the period of work by documented mutual agreement between the (insert name of teaching department) and MDB.

9.2 Period of Performance. The period of performance will not exceed 12 months for design, development, and validation without mutual agreement between the (insert name of teaching department) and MDB.

9.3 In-Process Reviews (IPRs). Scheduled in-process reviews will be conducted after each major development event. However, the (insert name of teaching department) or MDB may request an IPR at any time.8.0 Project Plan

10.0 Delivery of Products. All deliverables will be completed IAW the established milestone schedule (Attachment 3).

10.1 Course Design Plan. The course design plan is to be delivered within 10 working days after the initial coordination meeting.

10.2 Minutes/Reports. Minutes or after action reports (AARs) for each major in-progress review (IPR) are to be delivered within 5 working days after each IPR (e-mailed to each member).

10.3 Checklists. Checklists used for reviewing the design and development of each lesson, such as overall design conventions and specification plans, flowcharts, scripts, storyboards, prototypes, drafts of graphics and lessons will be delivered NLT the time of meetings or reviews.

10.4 Copies of the Product. Copies of all multimedia lessons, annexes, test question database and test generating program, programming templates, individual graphics files, scripting and open/editable source codes used to produce the final product will be delivered on CD-ROM and packaged in individual cases with appropriate descriptive labels. Upon completion of the project, MDB will furnish the (insert name of teaching department) an agreed upon number of CD-ROMs of the completed courseware.

11.0 Corrections of Errors and Omissions and Other Modifications

11.1 In the event that there are errors or omissions or if there is any need for clarification or modification of the Project Plan or any part of the project, please contact the (insert name of teaching department).

11.2 All modifications to this Project Plan must be approved by and coordinated with the leadership of the (insert name of teaching department) before those modifications are deemed approved and in effect.

12.0 Attachments.

#1 Lesson Titles, Lesson Hours, and Anticipated Level of Interactivity.

#2 List of References.

#3 Proposed Milestone Schedule.

ATTACHMENT #1

Lesson Titles, Hours, and Anticipated Level of Interactivity

Lesson Number	Lesson Title	Lesson Hours	Multimedia Level
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

NOTE: Actual number of hours per lesson may vary slightly due to lesson modification during design phase.

ATTACHMENT #2

References

1. TRADOC Regulation 350-70, Systems Approach to Training (SAT) Management, Processes, and Products.

2. TRADOC Pamphlet 350-70-2, Multimedia Courseware Development Guide.

3. DOD Handbook, MIL-HDBK-29612-3, Development of Interactive Multimedia Instruction (IMI).

4. TRADOC Guidelines for adding Hypertext Markup Language (HTML) 3.2.

5. ATTA Technical Standards Suite (formerly TRADOC Technical Media Standards).

6. Interactive Multimedia Instruction (IMI) Implementing Instructions.

7. Aviation Industry CBT Committee (AICC) standards,

8. FM X-XX (specific to the project)

9. AR XXX-XX (specific to the project)

Attachment #3

Proposed Milestone Schedule

NOTE: IMI lessons can be organized into groups with staggered starting dates to allow sufficient time for the design, development, and review process. (Insert name of teaching department) reviews will be conducted within 10 working days after each step.

Group A Day 1	Initial Coordination Meeting	Start date for prototype development
NLT Day 15	Step 1	Prototype of basic lesson design template submitted for approval.
NLT Day 30	Step 2	Storyboards of prototype basic lesson submitted for approval.
NLT Day 50	Step 3	Lesson prototype (on CD-ROM or web) submitted for review.
NLT Day 70	Step 4	Lesson prototype alpha test completed.
NLT Day 90	Step 5	Lesson prototype finalized.
NLT Day 100	Step 6	IPR #1 held with teaching department.

Group B Group Start		
NLT Day 120	Step 1	Storyboards of Group B lessons submitted for approval.
NLT Day 170	Step 2	Group B lessons (on CD-ROM or web) submitted for review.
NLT Day 190	Step 3	Group B lessons alpha test completed.
NLT Day 210	Step 4	Group B lessons finalized.
NLT Day 220	Step 5	IPR #2 held with teaching department

NOTE: After Group B, development of the next lesson groups will start on the day listed for Step 3 of the previous lesson group.

(Attachment #3. Proposed Milestone Schedule continued.)

Group C Group Start		
NLT Day 190	Step 1	Storyboards of Group C lessons submitted for approval.
NLT Day 205	Step 2	Group C lessons (on CD ROM or web) submitted for review.
NLT Day 225	Step 3	Group C lessons alpha test completed.
NLT Day 245	Step 4	Group C lessons finalized.
NLT Day 255	Step 5	IPR #3 held with teaching department.
NLT Day 345	Step 6	Validations (beta testing) completed and required changes made.
NLT Day 360	Step 7	Final IPR with teaching department.

APPENDIX C

MEMORANDUM OF COORDINATION BETWEEN

THE ASSOCIATE DEAN FOR DISTANCE LEARNING

AND

THE ACADEMY OF HEALTH SCIENCES TEACHING DEPARTMENTS, COMMANDER, 232d MEDICAL BATTALION AND THE U.S. ARMY AMEDD NONCOMMISSIONED OFFICERS ACADEMY

SUBJECT: Memorandum of Coordination (MOC) For the Development of Interactive Multimedia Instruction for the XXXXXX Course

1. Scope. This agreement is between the Chief, (Name of teaching department) and the Associate Dean, Department of Distance Learning, Academy of Health Sciences, Fort Sam Houston, Texas. This action involves the redesign of XX hours of existing paper-based instructional content into Interactive Multimedia Instruction (IMI) courseware.

2. Agreements.

a. The (name of teaching department) Course Director will:

(1) Submit a request for IMI development to the Associate Dean, Department of Distance Learning with a project plan, completed checklist for DL product development, and DITIS/DAVIS search results (Appendices A-C).

(2) Provide a Project Manager, Subject Matter Expert and Instructional Systems Specialist for the duration of IMI project development.

(3) Provide students for validation (beta testing) of IMI courseware.

b. The Associate Dean For Distance Learning in conjunction with the Multimedia Development Branch will:

(1) Redesign XX existing paper-based lessons into IMI courseware IAW the Project Plan.

(2) Validate the IMI training products IAW the validation plan.

(3) Complete IMI development within a 12-month period of performance.

SUBJECT: Memorandum of Coordination (MOC) For the Development of Interactive Multimedia Instruction for the XXXXX Course

c. This agreement will be reviewed at the request of any party from date of original signature to determine the need for continuation, modification, or termination. Modification, continuation, or termination shall be recorded in writing and executed by the parties as a joint action.

3. Effective Date. This Memorandum of Coordination will be effective upon last approving signature and will remain in effect until canceled, superseded, or modified by mutual consent of both parties.

.

_____	_____
RICHARD A. VALENZ	EDWARD M. KNIGHTS
Colonel, MS	Colonel, DC
Chief, Department of XXX	Associate Dean for Distance Learning, Academy of Health Sciences

APPENDIX D

SAMPLE TECHNICAL VALIDATION PLAN

FOR

(INSERT PROJECT NAME AND NUMBER)

INTERACTIVE MULTIMEDIA INSTRUCTION (IMI) PRODUCTS

AUTHORS

CPT CHARLES P. OUTLAW
Mr. RONALD JACKSON, Instructional Systems Specialist

(210) 221-XXXX/XXXX
FAX (210) 221-XXXX

COLONEL RICHARD VALENZ, MS
Chief, Department of Your Services
(210) 221-XXXX

Department of Your Services
Academy of Health Sciences
United States Army Medical Department Center and School
2250 Stanley Road
Fort Sam Houston, TX 78234-6137

TECHNICAL VALIDATION PLAN

FOR

(INSERT LESSON NAME AND NUMBER)

INTERACTIVE MULTIMEDIA INSTRUCTION (IMI) PRODUCTS

1. **Background**

The (insert name of department) is tasked with training Active duty, Reserve, and National Guard personnel to the same standard. Because the personnel are widely dispersed geographically and often have little or no accessibility to a formally staffed training facility**,** IMI products are developed to augment their training. The target audience personnel will generally conform to the characteristics listed below.

- Common skill level:
- Reading Grade Level:
- Average Education Level:
- Prerequisites: Those established by Army Regulation 350-1, Army Training and Education
- Length of Service:

2**. Purpose of Validations**

Validation is a critical part of the development process that tests whether the training materials are effective. Without validation, it is not known whether the lessons actually teach, or simply present information. During validation, student demographic data will be collected and performance, actions, and reactions will be observed and recorded. The data will then be analyzed and presented to the (insert name of teaching department) in the form of a validation report.

3. Validation Types/Methods

a. **Preliminary Validation (Individual Trials)** – A minimum of 2 SMEs or 1 trainee and 1 SME will complete each lesson on computer equipment that conforms to or simulates the actual equipment used to deliver the course (alpha testing). Course performance data will be collected to ensure that the content is accurate, verify that there are no software problems, and that the program branches correctly.

b. **Formal Validation (small group trials)** – A fixed sample with a minimum of 5 trainees from the target population will complete each lesson on equipment that conforms to or simulates the actual equipment used to deliver the course (beta testing). This is considered small group trials. Trainee performance and demographic data will be collected to determine if learning objectives are met, identify deficiencies, and provide guidelines for quality improvement.

c. **Online Validation** – The complete course is presented as both validation of the instructional material and as the first official iteration of the course. Use of this method is discouraged.

d. **Paper Validation** – A minimum of 1 SME and 1 ISS will review the course design, scripts, storyboards and audiovisual libraries. Any errors and deficiencies found will be documented and reported to the course designers and developers.

4. **Validation Site**

MDB will conduct validations on computers that meet or exceed the delivery platform specified in IMI Implementing Instructions and provide a server for testing IMI courseware. Small or large group validations will be conducted in a Distance Training Facility (DTF), learning resource center, or Army classroom on Fort Sam Houston.

5. **Validation Standards**

Each lesson will be validated separately. Seventy percent of the participating trainees must score 70% or higher on the posttest, depending on established course criteria. A minimum of 1 observer per 3 students should be present. Programming, hardware, and software problems should be documented immediately. Trainee attitudes and behaviors should also be assessed and documented. A lesson that fails to validate must be revised and validation trials must be repeated.

6. **Roles and Responsibilities**

a. MDB Validation and Testing Cell

(1) Tests hardware and courseware prior to validation.

(2) Coordinates validation activities.

(3) Assists department ISS with online lesson reviews.

(4) Observes and assists with validation.

(5) Assists department ISS in preparing validation report.

(6) E-mails DTF coordinator for configuration of classroom computers.

(7) Assists DTF personnel with acquisition and installation of plug-ins.

(8) Reserves classroom for courseware installation and validation process.

(9) E-mails date/time of pre-validation meeting to:

- MDB developers (provide courseware on CD)
- ITBC representative (load courseware on server)
- Virtual Schoolhouse/Librarian content manager (build and assign lessons on server)

(10) E-mails date/time of validation to:

- department project manager (info copy)
- department SME (provide students)
- MDB Instructional Developer (validate course)
- department ISS (observer)
- ITBC (support as needed)

b. Department ISS

(1) Reviews lessons online prior to validation.

(2) Observes validation.

(3) Reviews test item analysis report and assists MDB Instructional Designers and SME with revisions if indicated.

c. Subject Matter Expert (SME)

(1) Reviews lessons online prior to validation.

(2) Reviews validation report for errors and discrepancies.

(3) Provides names or number of participants for individual trials to Lead, Validation and Testing Cell and Virtual Schoolhouse Librarian content manager.

(4) Coordinates with Lead, Validation and Testing Cell to conduct small group trials.

(5) Requests target audience participants for small group trials from (RA/RC) unit.

(6) Ensures that participants for small group trials meet criteria for target audience.

(7) Ensures that participants for small group trials are in classroom at specified time.

d**. MDB Project Coordinator (team chief**)

(1) Tracks events and ensures quality control standards and milestones are met.

(2) Ensures all discrepancies noted during validation are corrected.

e. **Teaching department project manager**

(1) Provides Lead, Validation and Testing Cell with lesson titles and tentative dates for validation.

(2) Requests target audience participants register on Virtual Schoolhouse or Librarian Course Manager assign user ID and passwords to individual trial participants, small group trial participants, Lead, Validation and Testing Cell, and Department ISS as required.

f. **MDB Computer Specialist**

(1) Provides courseware (on CD) to Virtual Schoolhouse/Librarian Content Manager.

(2) Assists Virtual Schoolhouse/Librarian Content Manager with courseware installation as needed.

g. **Librarian Content Manager**

(1) Builds and associates lessons with course content

(3) Captures Test Item Analysis for each lesson and forwards to Lead, Validation and Testing Cell and to department ISS.

h. **ITBC**

(1) Copies course content to server.
(2) Resolves system hardware and system software problems

i. **DTF Responsibilities**

(1) Prepares classroom computers to access Virtual Schoolhouse.

(2) Ensures the appropriate distance training facility forms are completed.

APPENDIX E

IMI DEVELOPMENT STANDARDS

1.0 Specific Requirements

1.1. Multimedia Development Branch (MDB) will develop Interactive Multimedia Instruction (IMI) lessons of high instructional quality. Final determinations of acceptability of lessons produced will be made by the teaching department Project Manager. This appendix describes the technical implementing instructions to be followed for the development and delivery of IMI. In this area of IMI, the technology is changing rapidly , especially in the area of internet web based delivery. **For this reason, developers should check the following web site for any possible updates: http://155.217.20.177/TechMediaStand.htm**

1.2. MDB will be responsible for producing IMI, including instructional design, graphics production (video, photographs, illustrations), audio production, and evaluation of educational effectiveness, and implementation.

1.3. MDB shall use the latest version available at the AMEDDC&S of Allen Communication Designers Edge and Click2Learn's ToolBook II Instructor or Assistant to develop IMI courseware. Testing capabilities will be designed to be fully functional with both Internet Explorer 4.01 or higher and Netscape Communicator 4.06 or higher.

1.4. IMI Development Team. An IMI development team will be established to design, develop, and validate the IMI courseware. As a minimum, team members should include a Department Project Manager, Subject Matter Expert, and Instructional Systems Specialist and an MDB Instructional Designer, Instructional Developer, and Computer Specialist. Multimedia specialists from HSVID will provide graphics, audio, and video support as required.

1.5. Project Design Plan. MDB Course Coordinator in coordination with the department project manager and SME will develop a project design plan that will contain the overall course and lesson design flow and lesson objectives.

1.6. Student and Lesson Management. The management tools used to communicate lesson information and status will include bookmarking, lesson status within the course, time on lesson, test item results for item analysis, examination results, and lesson score. Other data items may be determined during development of the lessons.

1.7. Courseware Validations. MDB in coordination with the department project manager, subject matter experts, instructional systems specialists, and other reviewers as designated by the Teaching Department project manager will alpha test each lesson draft to evaluate the design, functionality, and content. A small group validation (beta test) on the final version of each IMI lesson will be conducted with students to evaluate educational effectiveness (transfer of knowledge). MDB will modify the instructional design as required.

1.8 Future Updates. MDB will retain full, open, editable source codes files for all IMI, storyboards, and graphics files plus all raw video and photographs as updates and modifications will be necessary in the future. An index of graphics, photographs, video clips, etc. with their related copyright releases, where applicable, will be retained in an electronic format.

2.0 **Implementation on Virtual Schoolhouse**.

2.1 MDB will use the Aviation Industry Computer-Based Training Committee (AICC) standards for data interchange with the AMEDD's Virtual Schoolhouse Course Course Management System (CMS) [http://kmn.army.mil]. The AICC standards may be downloaded from http://kmn.aicc.org on the Internet.

2.2 MDB will work with the AMEDD systems administrator to install and validate the final courseware products on the Virtual Schoolhouse to ensure proper interface and function of the Course Management System and lesson tracking features in the IMI courseware.

3.0 **Product Development Specifications**.

3.1 Computer Text. With the use of storyboards, MDB will maintain a consistent lesson appearance throughout each IMI lesson and within groups of related lessons. Hyperlinks and regular text characteristics such as color, size, font, style, placement, or use of capitalization will be consistent throughout the lesson.

3.2 Computer Graphics and Background. All graphics must be clear, complimentary to the content presented, and with 256 colors for photographs and videos and multiple, distinct colors for artwork, graphs, and text. The quality and appropriateness of each graphic will be determined by the teaching department

3.2.1 When graphics are presented, they will show in a size that is easily readable and the detail readily interpretable. When instructionally appropriate, graphics, forms, tables, and maps (grid, vicinity, and detailed definition) will have zoom in/out capabilities to provide a full screen view which shows full graphic/form/table, general vicinity on a map, or enlarged details.

3.2.2 Graphic images must be Graphic Interchange Format (GIF) or Joint Photographic Experts Group (JPEG) format of 256 colors (where appropriate). Graphics must meet the minimum requirements as outlined in TRADOC Regulation 350-70 and TRADOC Pamphlet 350-70-2.

3.2.3 Scanned graphics or facsimiles of documents used as graphics must be clear, readable, and in color when appropriate. Computer generated versions of documents and forms will contain enough of the details of the original to be an effective training aid.

3.2.4 Lessons will be developed for computer screen resolution of 800 x 600 pixels.

3.2.5 Backgrounds of photographs and videos must not be cluttered or inappropriate for the scene being depicted. Background graphics must not detract from the message, nor interfere with the readability.

3.2.6 Whenever military uniforms are included in a graphic or video they will be current and appropriate for the situation.

3.2.7 Adherence to and use of proper safety precautions, devices, and personal protective equipment (PPE) must be evident in photographs when appropriate.

3.3 Computer-Generated Animation and Video. Action conveying moving objects will be used only when necessary for effective learning IAW TRADOC Pam 350-70-2. Analog videotapes and recordings will be converted from the first or second generation copy to Motion Picture Experts Group 1 (MPEG 1) at the highest compression format but maintaining the same high video quality for CD-ROM based material. To display animation, convert to a video file, use animated GIF files, or use DHTML path animation with new versions of ToolBook II.

3.4 Digital Audio Format. Deliver audio in a RealAudio (.RA and .RAM) format. To keep the size small, deliver audio for monaural (mono), 8 bits per sample, at a sampling frequency of 11.025 kHz, if it does not detract from the teaching point. Use RealVideo and RealAudio as the streaming media formats for training delivery.

3.5 Computer Delivery Platform. All IMI lessons will be developed to run in a Windows 95 and higher environment. The minimum platform will be 100 MHz Pentium PC with 32 MB RAM, 4X speed CD-ROM, 16 bit Sound Blaster-compatible sound with speakers or headphones, 2 MB video RAM with 256 colors, and 28.8 K or higher modem connection.

4.0. **Instructional and Testing Strategy**.

4.1 Instructional Strategy. It is anticipated that IMI lessons will follow the general sequence of introduction, content, summary, and practice or appropriate learning activities. After a core of content is presented for each lesson, the style will include situations and scenarios in which the student can learn and practice analysis of situations, responses to situations, and problem solving. It is anticipated that these lessons will include branching according to specific scenarios, and that situation-based feedback and remediation will be used.

4.1.1 Lessons will include terminal and enabling learning objectives at the beginning of each lesson. Practice questions will be included within the lesson with remediation based on student performance.

4.1.2 A pretest will be included with each lesson to identify students' baseline knowledge of each task. Once the training requirements have been identified, instruction will be adjusted to correct the training deficiencies.

4.1.3 The final product will include the following: tutorial and help screens on how to use the courseware (e.g. navigation, points-of-contact at AMEDDC&S); a glossary with terms hyperlinked from "hot" words as well as being accessible at any point; bookmark capability; automatic link to e-mail (e.g. e-mail to faculty and support personnel in the Teaching Department and AMEDDC&S.

4.1.3 All lessons must track the student's progress within each lesson as well as from lesson to lesson or module to module and report this progress via the Course Management System (CMS) tool as specified in the Virtual Schoolhouse. Lessons will include hyperlinks to appropriate doctrinal and education references on the World Wide Web or on the CD-ROM.

4.2 Testing Strategy. Test items for the students generally will be randomly selected from test item databanks, although test strategy for selected objectives or content facts may be non-randomly selected. There will be a test item databank for each developed lesson, module, and final course test. This test item databank will also be linked to the written exam generating program, which can produce written exams in MS Word format.

5.0 **Special Instructions**. Should the use of copyrighted material be necessary, the Teaching Department will be responsible for obtaining permission to use, including paying any fees associated with obtaining the permission. Packaging and labeling will be IAW AR 25-71 and any other regulations or policies that may become effective before lessons are packaged and labeled.

6.0 **Reviews**. The Teaching Department review times will be 10 working after receipt of each lesson item/stage to be reviewed.

6.1 The Teaching Department must approve a Project Plan with a proposed milestone schedule and a project design plan for design conventions and specifications for the project as a whole before the lesson prototype is developed.

6.2 The Teaching Department must approve the lesson flowchart, storyboards, and graphics for each lesson before it is developed. MDB is responsible for quality control of the products (spelling, grammar, format correctness, etc.) before submitting any product for review.

6.3 A functional prototype of the first lesson must be approved by the Teaching Department before work proceeds on other lessons. Validation of a lesson prototype and the final draft IMI will include a complete technical test of the IMI to ensure functionality on the Virtual Schoolhouse. The MDB development team is authorized to observe classroom and field training before storyboard and production phase of IMI development. All visits must be coordinated with the project manager.

6.4 Validation of the instructional effectiveness of at least the final draft of each IMI by appropriate users/reviewers as designated by the department project manager is required. A written survey will be developed by MDB and used to collect feedback from all participants. A report of the corrections will be provided to the teaching department project manager.

7.0 **Government Furnished Information (GFI)**. The teaching department SME will provide technically accurate and current materials (e.g., references, digital files) to MDB before IMI development is initiated. No classified material will be used in the development of the course. Unless otherwise indicated, all GFI will be returned to the Teaching Department upon completion of the project.

8.0 **Milestone Schedule.**

8.1 Project Design Plan. A proposed project design plan will be presented for review and concurrence to the Teaching Department project manager before course design is initiated. Additional conversations prior to completion of the prototype may be necessary to complete all details of this plan. The project design plan may be modified during the course of the period of work by documented mutual agreement between the teaching department and MDB.

8.2 Period of Performance. The period of performance will not exceed 12 months without mutual agreement between the teaching department and MDB.

8.3 Scheduled In-process Reviews (IPRs) will be conducted after each major development event. However, teaching department or MDB may require an IPR at any time.

9.0 **Delivery of Products**. All deliverables will be completed IAW the established milestone schedule.

9.1 Project Design Plan - delivered within 15 working days after the initial coordination meeting .

9.2 Minutes or After Action Reports (AAR) for each major in-progress-Review (IPR) delivered within 5 working days after each IPR (e-mailed to each member).

9.3 Checklists used for reviewing the design and development of each lesson, such as overall design conventions and specifications plans, flow charts, scripts, storyboards, prototypes, drafts of graphics and lessons to be delivered NLT the time of meetings or reviews.

9.4 Copies of all multimedia lessons, annexes, test question database and test generating program, programming templates, individual graphics files, scripting and open/editable source codes used to produce the final product will be delivered on CD-ROM and packaged in individual cases with appropriate descriptive labels. Upon completion of the project, MDB will furnish the teaching department an agreed upon number of CD-ROMS of the completed courseware.

APPENDIX F

Interactive Multimedia Instruction (IMI)
LEVELS of INTERACTIVITY

http://155.217.20.177/levels/levelsi.htm

Current Level 1

This is the lowest (baseline) category/level of ICW development. It is normally a knowledge or familiarization lesson, provided in a linear format (one idea after another). Category/level 1 is primarily used for introducing an idea or concept. The user has little or no control over the sequence and timed events of the lesson material. Minimal interactivity is provided by selective screen icons and inserted into the lesson through typical input/output peripherals and programming protocols. This may include simple developed graphics clip art, video and audio segments (clips). Make use of typical input/output peripherals throughout the lesson.

Elaboration about Level 1

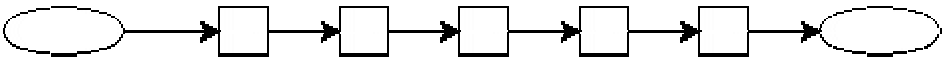
Definition: Level 1 is the lowest and the baseline level of ICW development. Use Level 1 to introduce an idea or concept, or to familiarize. Provide minimal interactivity by using selectable screen icons, which are inserted into the linear, or almost linear, flow of the ICW. Allow the student little or even no control of the sequence of instructional media presented, including: simple developed graphics, clip art; customer provided video and audio segments (clips). Make use of typical input/output peripherals throughout the lesson.

Instructional Flow: the instructional flow is essentially one-way -- flowing from the ICW to the student. Even when the student makes an input – as he is prompted – the input is minor: 'what is your name, date, unit?', 'type the following …', and 'select the correct …'

Training Taxonomy: cognitive domain, using the basic knowledge category (memorization). At this level do not expect students to comprehend the information; expect the students to memorize and restate it. This level can vary from isolated bits of knowledge to more abstract knowledge of theories or organizing structures.

Cues for Lesson Objectives: know, select, recite, observe, recall, define, list, identify, show, label, collect, name, describe.

Additional: at its most rudimentary use, level 1 is commonly called 'a page turner.'



Current Level 2

This involves the recall of more information than a category/level 1 and allows the student more control over the lesson's scenario through screen icons and other peripherals, such as light pens or touch screens. Typically category/level 2 is used for non-complex operations and maintenance lessons. Simple emulations or simulations are presented to the user. As an example, the user is requested to rotate switches, turn dials, make adjustments, or identify and replace a faulted component as part of a procedure. This also may include simple to standard developed graphics, and/or clip art, and customer provided video and audio clips.

Elaboration about Level 2

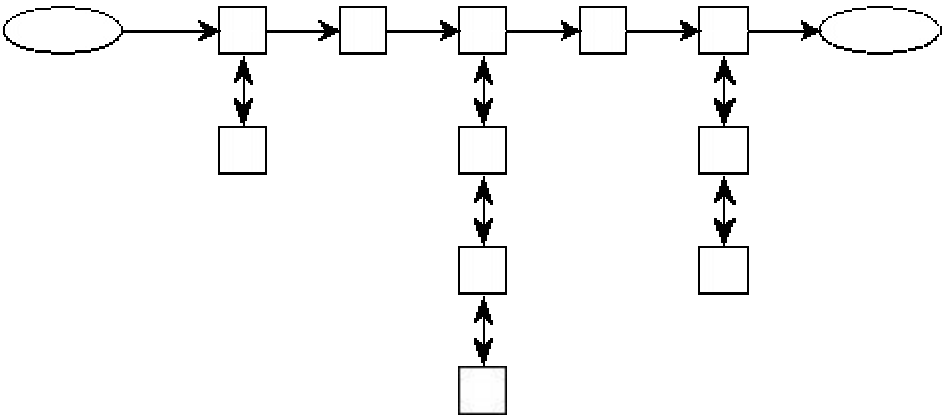
Definition: Level 2 requires the recall of more information than Level 1. Allow the student more control of the lesson by interacting with screen icons and other screen objects. Use multiple input objects on the screen to increase the interactivity of the lesson; multiple input objects cause branching structures to be built by you. Make the student response use lesson objective cues that cause the student to interact with the screen information. Use remediation extensively to reinforce the learning objectives. Remediation causes a particular section of the lesson to be repeated (a 'no go' situation). Use remediation by causing a branching action called a 'loop.' The loop can, in order of its complexity, provide feedback about that particular section, repeat/replay that particular section, or can provide entirely new instruction about that particular 'no go' section. Use simple branching for other instruction. Simple branching permits the student to veer from the main instructional path to seek additional information about a subject, however the student ultimately returns to his departure point. Instruction remains essentially linear, even though remediation loops, simple branching, and menus are used. Except for slight (i.e. remediation) digressions, the student moves through the instruction using a preplanned path. The ICW remains linear, but uses simple branching. Make use of typical input/output peripherals throughout the lesson.

Instructional Flow: the instructional flow is essentially two-way -- ICW prompting which causes the student to respond to lesson objective cues. The student response is tracked for ICW branching decisions and possibly for 'pass/fail' situations.

Training Taxonomy: cognitive domain, using exercise solving (an advanced knowledge category). Students memorize a procedure or series of steps, to solve exercises that are similar to those presented in class. Incidentally, exercise solving is a higher form of rote learning; the student may not understand why or even what he is doing, but he knows that by following these steps he can obtain the correct answer.

Cues for Lesson Objectives: recall, recognize, interpret, group, show, generalize, associate, distinguish, locate, and demonstrate.

Additional: at its most rudimentary use, level 2 presents a choice or question and after student interaction, immediately provides 'the correct solution,' or additional information.



Current Level 3

This involves the recall of more complex information (compared to categories/levels 1 and 2) and allows the user an increased level of control over the lesson scenario through peripherals such as light pen, touch screen, track ball, or mouse. Video, graphics, or a combination of both is presented simulating the operation of a system, subsystem, or equipment to the user. The lesson scenario training material typically is complex and involves more frequent use of peripherals to affect a transfer of learning. Operation and maintenance procedures are normally practiced with category/level 3 scenarios and students may be required to alternate between multiple screens to keep pace with the lesson material. Multiple software branches (two to three levels) and rapid response are provided to support remediation. Emulations and simulations are an integral part of this presentation. This may also include complex developed graphics, and/or clip art, and customer provided video and audio clips.

Elaboration about Level 3

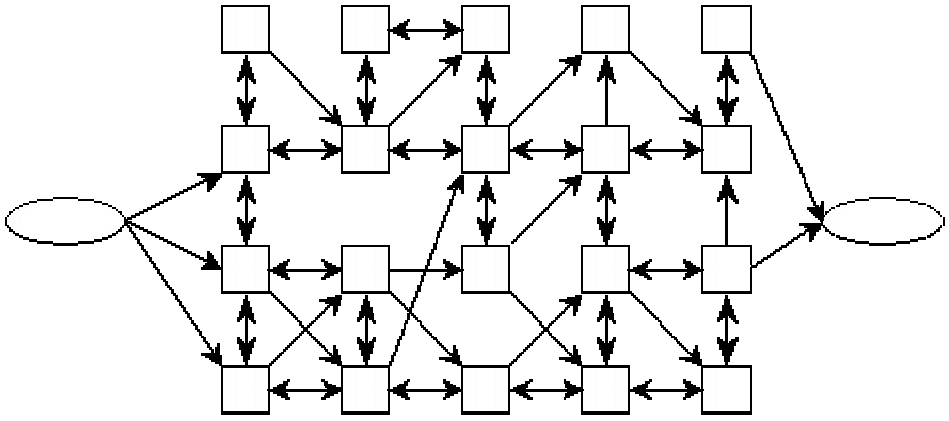
Definition: Level 3 involves applying information, even complex information, to solving a problem or to producing a result. Prompting is much reduced; less prompting allows the student a perceived increased level of control over the lesson. Use video, audio and graphics to simulate the operation or maintenance of equipment, a system or subsystem for the student. The ICW for level 3 typically is complex and can use peripherals such as a large screen TV or multiple monitors; the ICW can also include ancillary training materials. Use emulation and simulation as an integral part of equipment operation and maintenance. Include at this ICW level complex graphics and clip art, video clips, and audio clips. Provide the student decision points from which multiple branching will occur; multiple branching provides more reality to this level. Branching follows a student decision or input; create a multiple branch by allowing a

student to enter into a decision point, each decision has a corresponding branch and each of the branches will, in turn, lead to other decision points with corresponding branches. So a branch can lead to a branch that leads to another branch; typically, use no more than three or four branches in a multiple branching sequence. Remediation, if any, occurs at the end of an instructional block or at an important learning point (i.e. 'go/no go' condition). Feedback is typically used at the end of an instructional block to apprise the student of his progress. The ICW is only vaguely linear: the student moving from a start point to an end point; but because of the multiple branching feature, the student is able to progress through the ICW using any of multiple paths. Make use of typical input/output peripherals throughout the lesson to simulate the operation or movement of physical items.

Instructional Flow: the instructional flow is essentially one-way -- but in the opposite direction of Level 1 flow! The ICW does little prompting; instead the ICW presents information which the student must study, interpret, and use to provide correct responses which correspond to lesson objective cues. Student responses are tracked for ICW branching decisions and scoring.

Training Taxonomy: cognitive domain, using problem solving. Students use facts, rules and principles toward solving a problem. Students perform unprompted use of an abstraction (simulation via ICW) and apply what was learned from the ICW into novel situations in the workplace.

Cues for Lesson Objectives: apply, demonstrate, practice, use, construct, complete, solve, modify, change, discover, operate, produce, prepare, choose, investigate, employ, schedule.



APPENDIX G

SAMPLE SCREEN DESIGNS

Sample screen designs are on the pages which follow.

For additional screens designs, see MDB Portfolio.

Hospital Food Service Specialist
(91M)

Medical Service Corps

Patient Administration (71G)

APPENDIX H

LESSONS LEARNED

This section, a work-in-progress, reflects the wisdom of hindsight gained by both contractor-based and in-house IMI teams.

- **"Remember – it's business."** This should be our motto. Selection of a contractor should be based on the contractor's ability to deliver a quality product, not on whether the contractor is our best friend.

- **Project Plan or Statement of Work.** Follow the document. For in-house developed projects, the document may be adjusted as the project progresses. In that case, both MDB and the Teaching Department should agree on the changes.

- **The Prototype.** Make sure the prototype is correct before proceeding to develop other lessons in the same way. If an incorrect prototype is used as a model for subsequent lessons, mistakes are simply repeated. Those mistakes may be easily corrected, but those corrections take time . . . unnecessarily.

- **Audit Trail.** Whether the product is contractor-developed or in-house developed, always have someone keep an audit trail.

- **Never Assume.** A contract was approved with the assumptions that the computers available for courseware review and validation would have enough memory to view the product. The computers did not have sufficient memory. Always check everything!

- **Timelines.** Keep the timelines realistic and based on personnel capabilities; i.e., team member skills and time personnel are dedicated to the project.

- **Levels of DL – Early Agreement.** Ensure whomever you're dealing with understands that "adding bangs and booms" does not achieve level 2 or level 3 interaction.

- **Product Review and the Project Manager.** Be sure the Project Manager (PM) reviews all project documents. If a contractor is involved, the PM should deal with the contractor directly in reviewing documents.

- **Distance Learning – a Detail Oriented Business.** Characteristics of a quality distance learning product include consistency, graphics reflecting on-screen text and/or narration, audio sound at the same volume throughout, no misspelled words or grammar errors, etc. Only a detailed review results in an excellent product.

APPENDIX I

INFORMATION SOURCES

■ REGULATIONS

- ◆ TRADOC Regulation 350-70, Systems Approach to Training (SAT) Management, Processes, and Products
- ◆ TRADOC Pamphlet 350-70-2, Multimedia Courseware Development Guide
- ◆ DOD Handbook, MIL-HDBK-29612-3, Development of Interactive Multimedia Instruction (IMI)
- ◆ TRADOC Guidelines for adding Hypertext Markup Language (HTML) 3.2.
- ◆ ATTA Technical Standards Suite (formerly TRADOC Technical Media Standards)
- ◆ Interactive Multimedia Instruction (IMI) Implementing Instructions
- ◆ Aviation Industry CBT Committee (AICC) standards

■ RECOMMENDED READINGS

- ◆ Hall, Brandon. Web-Based Training Cookbook. New York: Wiley Computer Publishing, 1997.
- ◆ Driscoll, Margaret. Web-Based Training: Using Technology to Design Adult Learning Experiences. San Francisco: Jossey-Bass Pfeiffer, 1998.

■ HELPFUL WEB ADDRESSES

- ◆ AMEDD Distance Learning: **http://www.ches.edu**
- ◆ Army CBT/Correspondence Courses: **http://www.atsc.army.mil**
- ◆ Aviation Industry CBT Committee Standards: **http://aicc.org**
- ◆ DITIS/DAVIS: **http://afishp6.afisosd.mil/dodimagery/davis**
- ◆ Virtual Schoolhouse Course Management System: **https://kmn.army.mil**
- ◆ Reimer Training & Doctrine Digital Library: **http://222.adtdl.army.mil**
- ◆ Technical Media Standards: **http://155.217.20.177/TechMediaStand.htm**
- ◆ TRADOC Pam 350-70-2: **http://155.217.52.25/Pam**

APPENDIX J

GLOSSARY

- **Alpha Test** – Installing and running a computer based program on appropriate systems after development has been completed. The goal is to see if the course operates technically as it should.

- **Beta Test** – A final assessment of a computer based training program to determine if the software operates properly.

- **Evaluation** – Instructional materials are examined and judged carefully from an educational viewpoint. Does the instructional material teach the material presented.

- **Flow Chart** – A detailed version of the navigation map that guides the work of the development team

- **Government Furnished Information** – All materials needed to develop the project, materials supplied by the teaching department.

- **Multimedia** – The use of two or more of the following elements in a computer-based training program: text, images, video, audio, and animation.

- **Project Manager** – The individual from the teaching department who has the responsibility of being in overall charge of the project.

- **Project Plan** – The teaching department plan detailing what is required to be developed and why.

- **Subject Matter Expert** – An individual from the teaching department who is highly skilled and knowledgeable in a given topic area..

- **Validation** – Ensuring that a learning activity, instructional product, measurement instrument, or system is capable of achieving its intended aims and functions. For example, validation of instruction includes developmental testing, field testing, and revision of instruction to ensure that the instructional intent is achieved.